British Society for the Study of Orthodontics 1939

TRANSACTIONS
OF THE
BRITISH SOCIETY FOR THE STUDY OF ORTHODONTICS
1939

Digitized by the Internet Archive
in 2019 with funding from
Wellcome Library

https://archive.org/details/s6867id1324625

TRANSACTIONS

OF THE

British Society for the Study of Orthodontics

1939

London :
PUBLISHED FOR THE SOCIETY BY
THE DENTAL MANUFACTURING COMPANY LTD.
BROCK HOUSE, 97, GREAT PORTLAND STREET, W.1

OFFICERS AND COUNCILLORS

1939

President	Mr. S. A. Riddett.
Immediate Past-President ...	Mrs. L. Lindsay.
Vice-Presidents	Mr. C. S. Morris. Mr. N. Gray. Mr. M. A. Rushton.
Hon. Secretary	Mr. R. Cutler.
Hon. Treasurer	Mr. H. R. Evans.
Hon. Curator	Miss L. Clinch.
Hon. Librarian	Miss K. C. Smyth.
Hon. Editor	Mr. R. E. Rix.
Hon. Councillors	Mr. H. C. Apperley (London Member). Mr. G. Taylor (Provincial Member). Mr. W. Charles (with charge of programme arrangements).
Auditors	Mr. W. L. Boness Mr. S. B. Newton.

Headquarters of the Society: Manson House, 26, Portland Place, London, W.1.

Communications should be addressed to the Hon. Secretary, Mr. R. Cutler, 8, Lower Sloane Street, S.W.1; or 3, Walpole Road, Surbiton, Surrey; or any other officer particularly concerned.

British Society for the Study of Orthodontics

President : S. A. Riddett, Esq.

Hon. Treasurer : Mr. H. Chapman. *Hon. Secretary :* Mr. R. Cutler.

LONDON MEMBERS.

Ackner, C. A. 47b, Welbeck Street, W.1.
Ainsworth, N. J., 8, Upper Wimpole Street, W.1.
Aldred, A. B., 88, Park St., Grosvenor Square, W.1.
Apperly, H. C., 12, Chandos Street, Cavendish Square, W.1.
Ball, Leonard, 3, Park Crescent, W.1.
Ballard, C. F., 47, Okehampton Road, N.W.10.
Bane, B., 9, Cavendish Square, W.1.
Bell, A. W., 42, Devonshire Street, W.1.
Bell-Bonnett, V. W. A., 1295, London Road, Norbury, S.W.16.
Bennett, Sir Norman, 57, Harley Street, W.1.
Boness, W. L., 12, Maida Vale, W.9.
Boutwood, R., 23, Welbeck Street, W.1.
Bowes, J. A., 28, South Side, Clapham Common, S.W.
Bradley, Miss J. A., 1, Leeside Crescent, Golder's Green, N.W.11.
Bragg, R. N., 413, Brixton Road, S.W.
Bull, F. B., 69, Wimpole Street, W.1.
Buxton, J. L. Dudley, 38, Harley Street, W.1.
Campkin, H. T., 71, Harley Street, W.1.
Chapman, Harold, 6, Upper Wimpole Street, W.1.
Christian, H. B., 1, Rosslyn Hill, Hampstead, London, N.W.3.
Clarke, J. F., 67, Wimpole Street, W.1.
Clinch, Miss L. M., 27, Wimpole Street, W.1.
Coe, W. E., 50, Wimpole Street, W.1.
Cregan, T. C., 39, Wimpole Street, W.1.
Cribb, H. E., 19, Wimpole Street, W.1.
Cross, A. B., 21, Devonshire Place, W.1.
Cutler, Robert, 8, Lower Sloane St., S.W.1.
Dey, Miss Ivy G., 1, Marble Arch Mansions, 475, Oxford Street, W.1.
Doherty, J. W., 140, Harley Street, W.1.
Dowsett, E. B., 12, Gloucester Place, Portman Square, W.1.
Duncan, James B. G., 29, Tooting Bec Gardens, Streatham, S.W.16.
Eady, B., 29, Devonshire Place, W.1.
Endicott, C. L., Eastman Clinic, Gray's Inn Road, W.C.
Evans, H. R., 3, Park Crescent, W.1.
Fairbank, J. G. A., O.B.E., 5, York Gate, Regent's Park, N.W.1.
Farris, C. D., 42, Burnt Ash Road, Lee, S.E.12.
Fouraker, L. F., 29, Central Hill, Upper Norwood, S.E.19.
Fox, R. A., 13, Wetherby Gdns., S.W.3.
Freeth, H. W. F., 88, Park Street, Grosvenor Square, W.1.
Freiberger, I., 40, Shaftesbury Ave., W.1.
Fry, J. C., 17, Upper Wimpole Street, W.1.
Gardiner, Miss B., 25, Spencer Hill, Wimbledon.
Gardner, S. M., 24, Upper Wimpole Street, W.1.
Garrow, A., 115, Harley Street, W.1.
Gillies, A. R., 24, Alvanley Gardens, Finchley Road, Hampstead, N.W.6.
Grant, H. D., 12, Manchester Square, W.1.
Grayson, J. K., 60, Portland Place, W.1.
Green, C. de V., 11, Devonshire Place, W.1.
Green, W., South View, 10, North Common Road, Ealing, W.5.
Greenish, V. A. F., 52, Welbeck St., W.1.
Gross, V. D., 11, Baker Street, Portman Square, W.1.
Harborow, G. J., Isolation Hospital, World's End, Winchmore Hill, N.21.
Hardy, E. A., 79, Harley Street, W.1.
Henry, C. Bowdler, 62, Harley Street, W.1.
Henry, C. J., 78-79, King William St., E.C.4.
Henry, O. J., 9, Chandos Street, Cavendish Square, W.1.
Highton, H. C., 35, Devonshire Pl., W.1.
Hillyard, V. W. H., 22, Rosslyn Hill, N.W.3.
Hovell, J. H., 3, Portland Place, W.1.
Humpherson, Mrs. V. W., 25a, Eccleston Street, Victoria, S.W.1.
Hunt, Miss W. M., 4, High Croft, North Hill, Highgate, N.6.
James, W. W., 2, Park Crescent, Portland Place, W.1.
Jennings, E. A., 1, Castlebar Hill, Ealing, W.5.
Johnson, Mrs. E. M., 57, Harley Street, W.1.
Johnson, G., 46, Lee Terrace, Blackheath, S.E.3.
Jones, D. Rhys, 39, Wimpole St., W.1.
Lacey, A. G., 19, Harley St., W.1.
Leatherman, G. H., 35, Devonshire Place, W.1.
Levien, L., 50, Wimpole Street, W.1.
Lindsay, Mrs. L., 13, Hill St., Berkeley Sq., W.1.
McCallin, S., 44, Sloane Street, S.W.1.

McKechnie, B. G., 2, Harley Street, W.1.
McLeod, A. C. R., 4, Wimpole Street, W.1.
Marsh, L. R., 14, Lancaster Gate, W.2.
Marston, Alvan T., 74, South Side, Clapham Common, S.W.4.
May, W. J., 24, Upper Wimpole St., W.1.
Mellersh, W. F., 9, Harley Street, W.1.
Messenger, H. L., 47, Rosslyn Hill, N.W.3.
Michaelis, Mrs. 143, Fordwych Road, N.W.2.
Morris, C. S., 88, Park Street, W.1.
Morton, W. E., 35, Devonshire Place, W.1.
Newton, S. B., "Brooklands," Uxbridge Road, Acton Hill, W.3.
Northcroft, G., 115, Harley Street, W.1.
Ovey, W., 5, Orsett Terrace, W.2.
Packham, A. L., 79, Portland Pl., W.1.
Parr, W. B., 30a, Wimpole Street, W.1.
Pavitt, P. G., 57a, Wimpole Street, W.1.
Payne, A. Ll. S., 98, Harley Street, W.1.
Pearce, F. J, 57a, Wimpole Street, W.1.
Power, H. L., 270, Earl's Court Road, S.W.5.
Pringle, K. E., 37, Wimpole St., W.1.
Reid, D., 2, Harley Street, W.1.
Revill, W. E., 202, High Street, East Ham, E.6.
Richards, H., 14, Railway Approach, London Bridge, S.E.1.
Riddett, S. A., 42, Harley Street, W.1.
Ritblat, J. R., 29, Worple Road, Wimbledon.
Rix, R. E., 37, Wimpole Street, W.1.
Roberts, C. W., 60, Harley Street, W.1.
Robinson, Seymour G., 107, Finchley Road, N.W.3.
Rubra, C. H., 140, George Street, Bryanston Square, W.1.
Rushton, M. A., 32, Harley Street, W.1.
Salt, H. O., 6, Rosary Gardens, South Kensington, S.W.7.
Samuel, B. B., 20, Hallam Street, W.1.
Sargent, V. F., 7, Harley Street, W.1.
Searle, C. G., 12a, Grosvenor Street, W.1.
Sharp, P. B., 60, Portland Place, W.1.
Sirey, J. S., 2, Devonshire Place, W.1.
Skipper, T. G., 52, Welbeck Street, W.1.
Smyth, Miss K. C., 35, Devonshire Place, W.1.
Southwood, S. W., 91, Hamilton Terrace, St. John's Wood, N.W.8.
Spiller, J. E., 62, Worple Road, Wimbledon.
Steadman, B. St. J., 67, Wimpole Street, W.1.
Steadman, S. F. St. J., 67, Wimpole Street, W.1.
Stephens, B. M., 60, Portland Pl., W.1.
Strickland, J. H., 1, Mount Street, Berkeley Square, W.1.
Sturridge, M. H. G., 75, Grosvenor Street, W.1.
Sturrock, J., 19, Wimpole Street, W.1
Sutherland, Miss J. H. M., 22, Welbeck Street, W.1.
Tattersall, H., 411, Finchley Rd., N.W.3.
Taylor, Miss M. M., 7, Lawn Road, Belsize Park, N.W.3.
Thew, W., 16, Upper Wimpole St., W.1.
Torrance, T. A., 4, Queen Anne Street, Cavendish Square, W.1.
Tuck, R. W., 270, Earl's Court Road, S.W.5.
Tupling, L. P., 45, Wimpole Street, W.1.
Walker, F. A., 21, Devonshire Place, W.1.
Wallis, S. E., 431, Footscray Road, New Eltham, S.E.9.
Walther, D. P., 14, Buckland Crescent, Hampstead, N.W.3.
Warner, F. S., 105, Harley Street, W.1.
Webb, W. T., Clarkson, 25, Weymouth Street, W.1.
Williams, P. Lloyd, 128, Harley St., W.1.
Winn, T. L., 62, Station Road, Chingford, E.4.
Wookey, E. E., 26, Wimpole St., W.1.
Wydell, H. H., 60, Harley Street, W.1.

PROVINCIAL MEMBERS.

Bedfordshire.

Royle, G. W., 6, Goldington Road, Bedford.

Berkshire.

Archibald, H. M. D., 39, London Road, Reading.
Butchart, J. S., 14, High Street, Windsor.
Dickens, D. T. G., Wellington House, 175, King's Road, Reading.
Ellingham, G. H., 39, London Road, Reading.

Berkshire (*continued*)

Fry, Miss K. M., Upcross Hotel, Berkeley Avenue, Reading.
Inman, J. E., "Beechcroft," Wokingham, Berks.
Parfitt, J. B., 179, King's Road, Reading.

Buckinghamshire.

Ness, A. B., Beverley House, Chesham.

Cheshire.

Hughes, T. M., Lister House, Broomfield Lane, Hale, Altrincham.

Devonshire.

Dagger, H., St. Paul's Road, Newton Abbot.
Lake, C. P., 22, Southernhay West, Exeter.
Still, Miss E. M., Torquay Education Authority, School Medical Department, 15, Castle Road, Torquay.
Turner, J. Macdougall, 5, Park Crescent, Torquay.

Dorsetshire.

Duchesne, H. W., 15, Station Road, Swanage.

Essex.

Brears, O. B., Monkwood Cottage, Loughton.

Gloucestershire.

Dagger, T., Alma House, Cheltenham.
Johnson, W. T., 12, Richmond Hill, Clifton, Bristol, 8.
Kettlewell, N. H., "Lodway," Easton in Gordano, Bristol.

Hampshire.

Crane, W. A., Melford Lodge, Bourne Avenue, The Square, Bournemouth.

Hertfordshire.

Catchpole, O. N., 6a, North Street, Bishop's Stortford.
Charles, S. W., Devonia, Rickmansw'th.
Daplyn, R. G., Dilston, 27, Lemsford Road, St. Albans.
Fisk, S. W., Street Lodge, Essex Road, Watford.
Schofield, J., Luton Road, Harpenden.
Smallbone, N. L., 4, Arden Grove, Harpenden.
Taylor, A. Gordon, 28, Battlefield Road, St. Albans.
Warburton, D. U., 107, Norton Way, Letchworth.

Kent.

Cross, Miss Mary, 48, London Road, Tunbridge Wells.
Edey, G. R., 153, High Street, Bromley.
Hooper, K., 8, Copers Cope Road, Beckenham.
Horton, J. S. F., 46, Ridgeway, Hayes.
Page, G. Scott, 65, Mount Ephraim, Tunbridge Wells.
Pain, A., 17, Earl's Avenue, Folkestone.

Lancashire.

Campion, D. H., 264, Oxford Road, Manchester.
Capon, P. G., 49a, Rodney St., Liverp'l.
Headridge, W., 323, Oxford Road, Manchester.
Patterson, T. B., 84, Station Road, South Shore, Blackpool.
Radford, M., Dental Hospital, Pembroke Place, Liverpool 3.
Robb, G. C., 22, Hoghton Street, Southport.
Stones, Prof. H. H., School of Dental Surgery, Boundary Pl., Liverpool 7.

Lancashire (*continued*)

Watkin, H. G., 25, Rodney Street, Liverpool.
Wilkinson, Prof. C. F., Dental Hospital of Manchester.

Leicestershire.

Downing, F. J., "Carisbrooke," London Road, Leicester.
Rowlett, A .E., "Carisbrooke," London Road, Leicester.
Rowlett, J. A. T., "Carisbrooke," London Road, Leicester.

Lincolnshire.

Holms, S., Officers' Mess, R.A.F., Cranwell.

Middlesex.

George, Miss V. H., "Widdicombe," Kenton Road, Harrow.
Hobdell, H. G., Barclays Bank Chambers, 355, Station Road, Harrow-on-the-Hill.
Holland, R. O., 15, Crossways, Wembley Park.
Hudson, J. A., "Glenfield," 431, Pinner Road, Harrow.
King, F. L., 1, Peterborough Road, Harrow-on-the-Hill.
Lilley, W. A., 1, Coniston Road, Twickenham.
Metcalf, H. F., South Court, Hayes.

Norfolk.

Bryan, H., 26, St. Mary's Croft, Chapel Field North, Norwich.

Northamptonshire.

Wood, B. J., 5, Westleigh Road, Barton Segrave, Kettering.

Northumberland.

Cooper, E. R., 18, Victoria Square, Newcastle-on-Tyne.
Jameson, A., 18, Jesmond Road, Newcastle-on-Tyne.
Jameson, J. T., 12, Windsor Crescent, Newcastle-on-Tyne.
Markham, L. M., 1, Victoria Square, Newcastle-on-Tyne.
Richter, L., 1, Newgate Street, Morpeth

Oxfordshire.

Williams, D. S. H., 101, Banbury Road, Oxford.

Surrey.

Caseley, Miss R., Larkfield, New Malden.
Curtis, G. H., Faircroft, Shawley Way, Epsom Downs.
Friend, George C., "Woodbourne," Knoll Road, Camberley.
Kelham, Miss M. M., 29, Park Hill, Carshalton.
Laughton, C. H. B., 2, Cranbrook Drive, Esher.
Levin, H., 33, Hill Street, Richmond.
Mayer, J.W., Stedham Ho. Surbiton Hill.
Miron, G., 175, Kew Road, Richmond.
Pearce, R. M., "Hillrise," Hanger Hill, Weybridge.

Surrey (*continued*)

Pilbeam, J., "St. Antony," Cheston Avenue, Croydon.
Pook, R. S., Clydesdale, Hersham Road, Walton-on-Thames.
Sowden Hills, W. A., 11, Barham Road, Croydon.
Townley, S. G., "Woodbourne," Knoll Road, Camberley.
Young, Matthew, M.D., Woodburn, Oaklands Avenue, Esher.

Sussex.

Gray, N., 13, College Road, Eastbourne.
Heald, O. W., 8, Grange Rd., Eastb'ne.
Marsh, H. E., 1, Cantelupe Road, Bexhill.
Middleburgh, H., 44, Sackville Rd., Hove,
Pickard, H. M., Victoria Memorial Hospital, East Grinstead.
Rilot, C. F., Clovelly, St. Andrews Road, West Worthing.
Visick, H. C., The Wolds, College Road, Eastbourne.

Warwickshire.

Day, Aubrey J. W., 81, High Street, King's Heath, Birmingham.
Hollick, R. L. B., 202, Broad Street, Birmingham.
Matthews, G. F. Cale-, 54, Newhall Street, Birmingham.
Matthews, T., 42, Sheep Street, Stratford-on-Avon.
Roe, S. H., 95, Newhall St., Birmingham.

Worcester.

Steynor, H., Buckingham House, Graham Road, Great Malvern.

SCOTLAND.

Archibald, W. C., 125, Nethergate, Dundee.
Campbell, W. G., 27, Tay St., Dundee.
Gillieron, F. E., Duff Avenue, Elgin.
Johnson, J. M., 17, South Tay Street, Dundee.
Kemball, C. H., 20, Ainslie Place, Edinburgh 3.
Logan, W. Russell, 1, George Square, Edinburgh.
Wilson, A. G., 9, Sandyford Place, Glasgow, W.

IRELAND.

Flanagan, L., 29, Lower Baggot Street, Dublin.
Friel, S., D.Sc., 3, Fitzwilliam Place, Dublin.
Keith, J. E., 13, Upper Fitzwilliam Street, Dublin.
McKeag, H. T. A., Suite No. 142d, Scottish Provident Buildings, Donegall Square, W., Belfast.
Sterling, Mrs., 13, Upper Fitzwilliam Street, Dublin.

HONORARY MEMBERS.

Badcock, J. H., Priors Close, Walsham le Willows, Bury St. Edmunds.
Brash, Prof. J. C., The University, Edinburgh.
Campion, G. G., Inglegarth, Bramhall, Cheshire.
Hopson, M. F., Pinegrove, Crowthorne, Berks.
Keith, Sir A., Royal College of Surgeons, Lincoln's Inn, W.C.2.
Lundström, Dr. Axel F., Stureplan, 19, Stockholm, Sweden.
Wallace, J. Sim, 14, Church Grove, Hampton Wick, Middlesex.

CORRESPONDING MEMBERS.

Australia.

Adamson, K. T., 61, Collins Street, Melbourne.
Seward, J. T., 55, Collins Street, Melbourne.
Taylor, A. Thornton, 175, Macquarie Street, Sydney.
Wilkinson, W. S., 145, Collins Street, Melbourne.

Egypt.

Salama, N., 127, Queen Nazli Avenue, Cairo.

Finland.

Johanson, C., Annegaton 20, Helsingfors.

India.

Ghosh, Amarendra S., 54, Chowringhee, Calcutta.

Italy.

Winderling, Prof. A. Maggioni, Via Sonato 28, Milan.

U.S.A.

Sillman, J. H., 667, Madison Avenue, New York City.

Africa.

Noriskin, J. N., 39, Jenner Chambers, 189, Jeppe Street, Johannesburg.

Sweden.

Pålsson, K. F., Stortorget 25, Malmö.

INDEX

PAGE

Notes on Surgical Procedure in Orthodontic Treatment. By S. A. Riddett, L.D.S. 9

An Acquired Forward Position of the Mandible as a Result of the Early Removal of the Deciduous Molars. By W. A. Sowden Hills, L.D.S.Eng. ... 22

The Distal Movement of the Molar Teeth as one of the First Steps in Treatment. In Conjunction with the Practical Technique of a New Automatic Mechanical System. By Dr. Lucian De Coster 39

Demonstrations :—

Serial Models to show (a) Some Phases of Normal Development of Occlusion, and (b) The Final and Permanent Results of Treatment. By Harold Chapman, L.D.S.Eng. 68

The Use of an Adjustable Condyle Path Articulator as a Diagnostic Instrument in Orthodontics. By G. H. Ellingham, L.D.S. U.Birm. 68

Serial Models from Birth to Four Years. By Miss Lilah Clinch, L.D.S.Irel. 69

A Modern Expansion Plate Worn at Night Only. By O. Henry, L.D.S.Eng. 69

Reports of Meetings 70

Annual General Meeting Reports and Accounts ... 72

The British Society for the Study of Orthodontics

Notes on Surgical Procedure in Orthodontic Treatment*

By S. A. Riddett, L.D.S.

WITH regard to the Presidential Address, said Mr. Riddett, the available time for its preparation being so short, he had hoped that he might have escaped it. However, he had not been allowed to. He had done the best he could, and trusted they would be indulgent in the circumstances.

He had no hope of preparing a classic address on the lines of those of past presidents, which were models of what such things ought to be. It had been suggested to him that he should make it "something practical," and his effort that evening was an attempt to carry out that advice.

Opportunities he had had during the last few years of gaining some experience of minor surgical procedures included many which involved operating on children, mostly in collaboration with, or at the request of colleagues. It was chiefly a description of some of the conclusions he had come to which formed the subject of his address that night. His address should have one merit. It would not take up much time, as they had another item on the programme.

As far as he could gather, the operations often described as "immediate regs" were not now practised. They knew the kind of thing. A front tooth, usually an incisor, was moved bodily into alignment by means of a specially designed instrument and fixed in its new position by cementing on a splint, previously prepared. That heroic type of operation appeared to have been abandoned. The improvement in apparatus in recent years was such that teeth could be translated from one point to another very gradually and without the risk of rupturing the apical vessels.

Again, the operation of removing the developing mandibular third molar, advocated and practised by Mr. Bowdler Henry, was undoubtedly very much a surgical procedure which had a bearing on orthodontic treatment, but he did not propose to describe or discuss the method. He would refer members to Mr. Henry's recent contributions to the *American Journal of Orthodontics and Oral Surgery* (Vol. XXIV, No. 1, page 72, January, 1938).

Major operations involving complete section through the whole thickness of the mandible on both sides, and re-setting the fragments by means of wiring, were of great interest and he would touch on them lightly.

* Presidential Address delivered to the Society, 6th February, 1939.

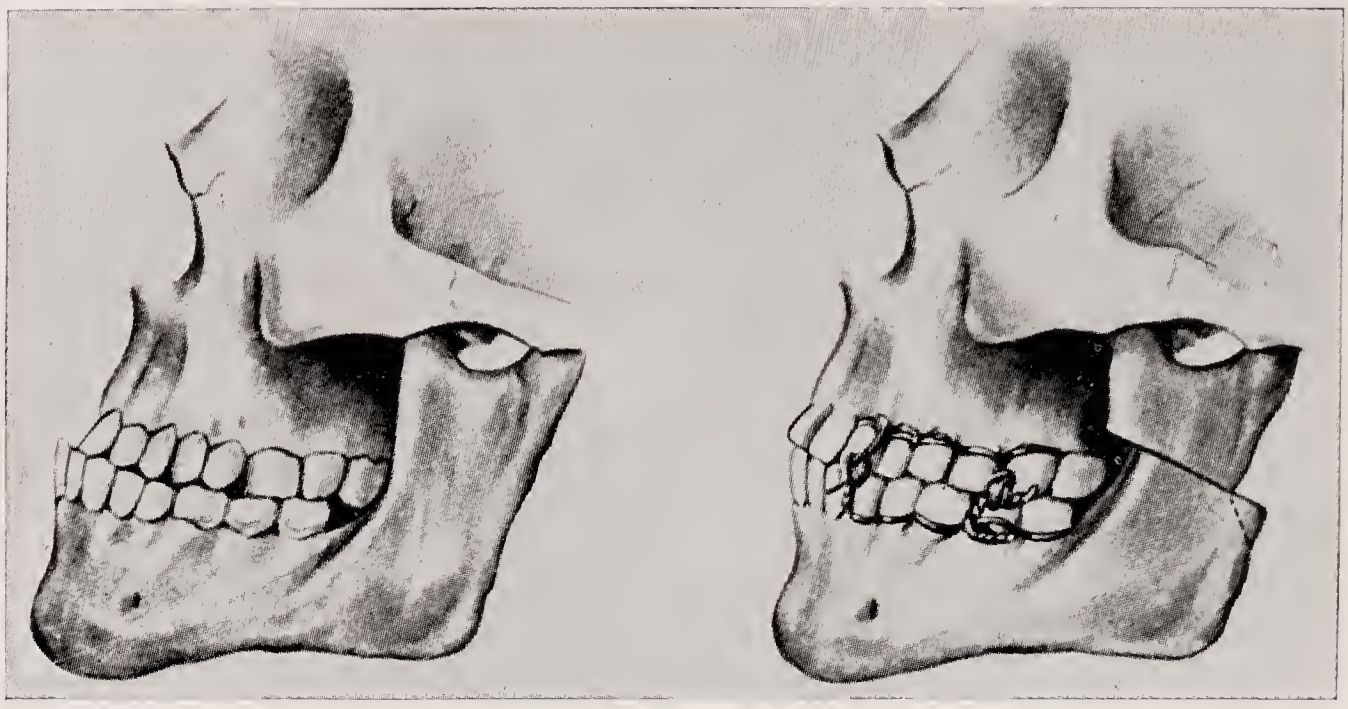


Fig. 1

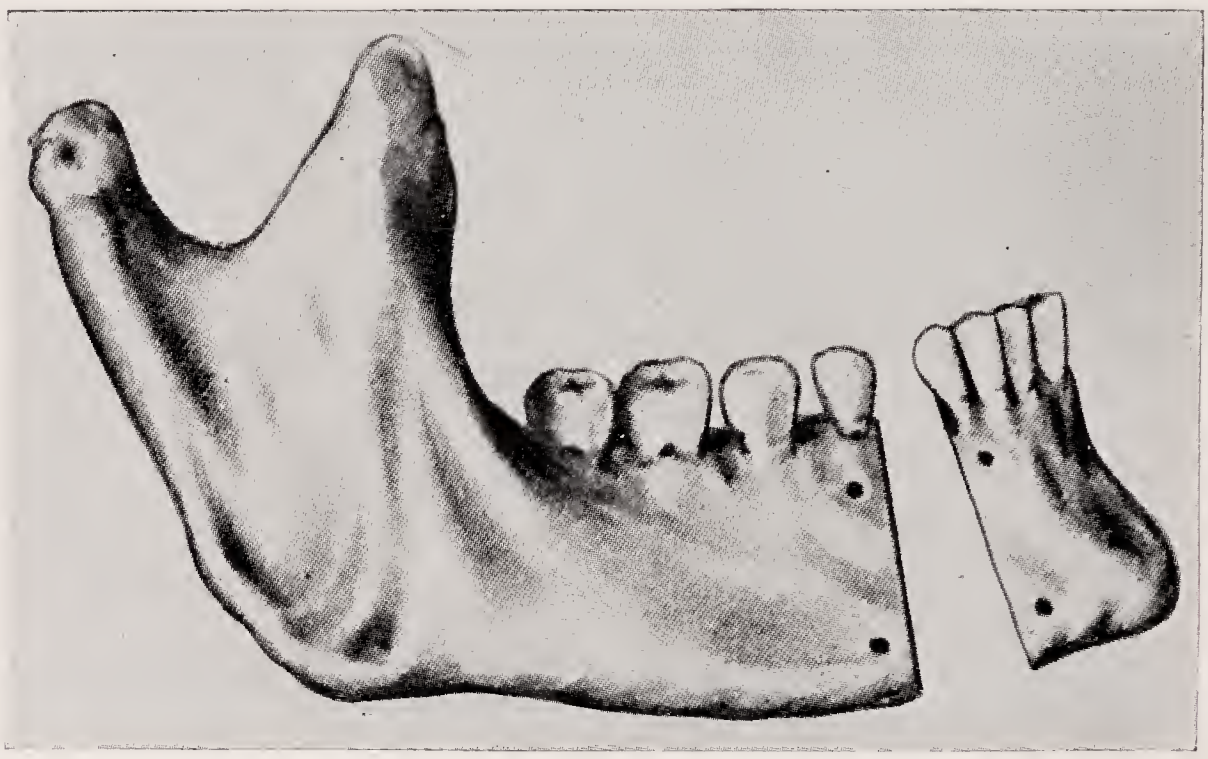


Fig. 2

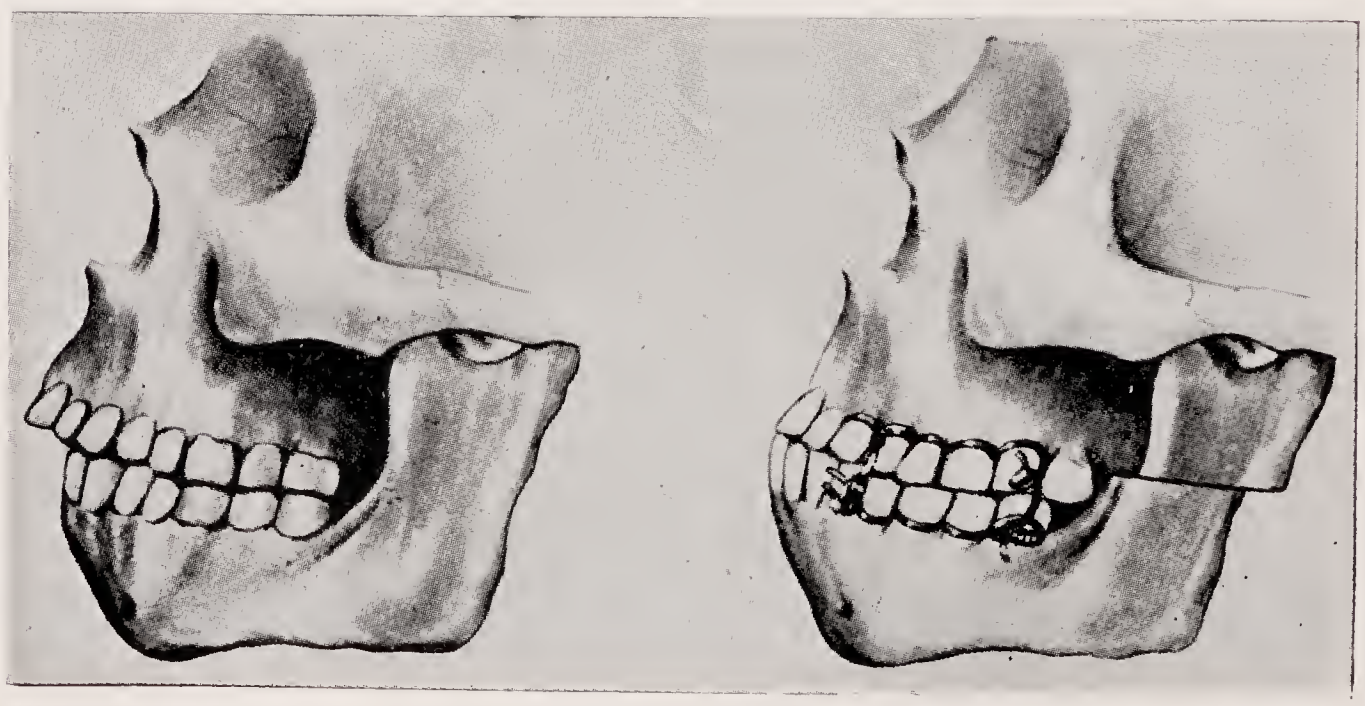


Fig. 3

Figure 1 showed a condition which, for lack of a better description, he would call Prognathism ; it was treated, as they saw, by division of the ascending rami and intermaxillary wiring, moving the jaw into its new position and treating the case as a fracture. The bone was bevelled in the region marked by the dotted line, thus ensuring that the posterior border of the united ascending ramus would be smooth.

Figure 2 was an extravagant example of prognathism, showing an operation which had been practised and known for some time as "Blair's operation." A section of bone was removed from the horizontal ramus of each side. The section had been cut clean out. The operation was for very great degrees of protrusion of the mandible. Silver wire was passed through the two holes already drilled, and the jaw was set back in its new position. It involved opening up the mucous membrane of the mouth, draining the wound, boring holes to wire fracture, and the fixing of intermaxillary wiring or splint.

Exactly the opposite kind of thing, micrognathism, was seen in figure 3. The jaw had been moved forward into a new position instead of, as in the prognathic type, backward, by the same kind of incision. Some of them would remember Mr. Watkin's classic case, in which an adult was treated in this way with great success. In that case he co-operated with a surgeon. This case was perhaps a modification of the one he had described. It was put in for the sake of completeness, to show what was meant by heroic measures.

The "notes" referred to in the title of his address had to do with simple procedures, which, however, had undergone certain modifications during recent years, due, perhaps chiefly, to the perfecting of anæsthetic technique, and especially that of prolonged NO_2 and O_2 anæsthesia by the endo-tracheal method, which enabled the dental surgeon to plan and conduct his operations more deliberately and, consequently, with less trauma to the tissues.

The removal of the unerupted first premolars afforded an example. Instead of the "dash in" under a "straight gas" with long-bladed forceps opened wide to make sure of including everything in their path, this precedure was now undertaken on the operating table in hospital or nursing home, the premolar exposed by turning back an adequate flap of gum, any overlying bone carefully removed and the tooth lifted out.

He would now show some slides of a case which he did many years ago, and which, for a time, was in the museum of the Society. It was the case of a girl, aged, when she first came to him, 7 years. Models of the original condition were shown in figures 4 and 5. X-rays were also taken (figure 7). The case dated back to 1921, and he had no little difficulty in deciding upon the best line of treatment. The incisors had begun to cross over; the parent remarking that these teeth could almost be seen, week by week, getting more crowded, and pushed across each other. An operation was performed in March, 1922, at which he removed the C's and D's, upper and lower, and all four unerupted premolars. He had found it to be an heroic operation.

Fig. 4

In July, 1924, he had had an opportunity of treating the girl again. At the operation he had, in fact, damaged the second deciduous molar so much that it had had to be removed. In 1924 she still had one deciduous molar, but the one already referred to had been replaced by a premolar. They would see in the last model shown the condition in 1931, ten years later.

Figure 6 showed a front view and illustrated very well the crowding of the incisors ; also a model dating two or three years later, and another, in 1931, ten years later, in which the alignment of the teeth was very good. In the actual case itself, the result was very excellent, at any rate from a cosmetic pont of view, although he was quite well aware that if the proceedings were open to discussion on his paper, he might be challenged. He remarked that the occlusion on the right side had always been

Fig. 5

more satisfactory, but on the left-hand side it was not quite so happy. In the picture taken in 1931 there was lack of occlusion between the premolars on that side. They could see what had happened, of course, the jaw had collapsed in some degree, but, functionally, the result was quite good. The X-ray of the case showed the inclination of the canines which he had had as some sort of guide. As he had said, he had been a little afraid of that case, and had taken it round to several people, but nobody would quite commit themselves to a line of treatment, so he had finally adopted the procedure shown. He had seen the patient a few weeks ago ; she was now, if his arithmetic served him right, about 25 years of age, and she had lost, since then, all her wisdom teeth and one lower

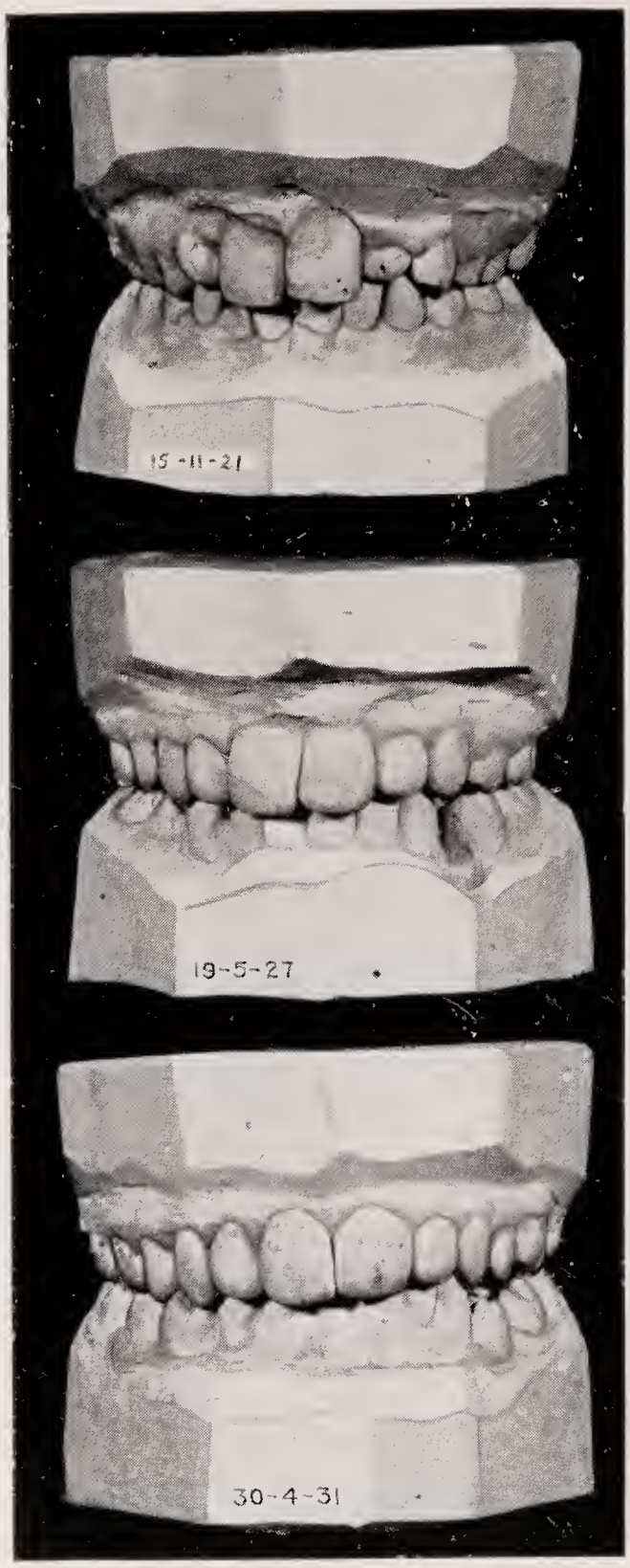


Fig. 6

permanent molar tooth ; but, functionally, she was quite healthy and, to his relief, the soft tissues were also in very good condition.

The removal of deeply-placed supernumerary teeth, or denticles, sometimes presented difficulty ; the rule in all such cases was to ensure adequate access. This often entailed laying back a very big flap in the palate, but, if that were not done, it was hopeless to try to get at the bone which had to be removed, or to catch a glimpse of the tooth when it had been located.

Fortunately, those large flaps, in young children, caused no anxiety, and, even if not sutured, would glue back into place so effectually that was the exception to find any complaint of pain or discomfort, even the day after. He had only known one case of this kind to suppurate.

A typical case of a buried denticle was shown in figure 8. They

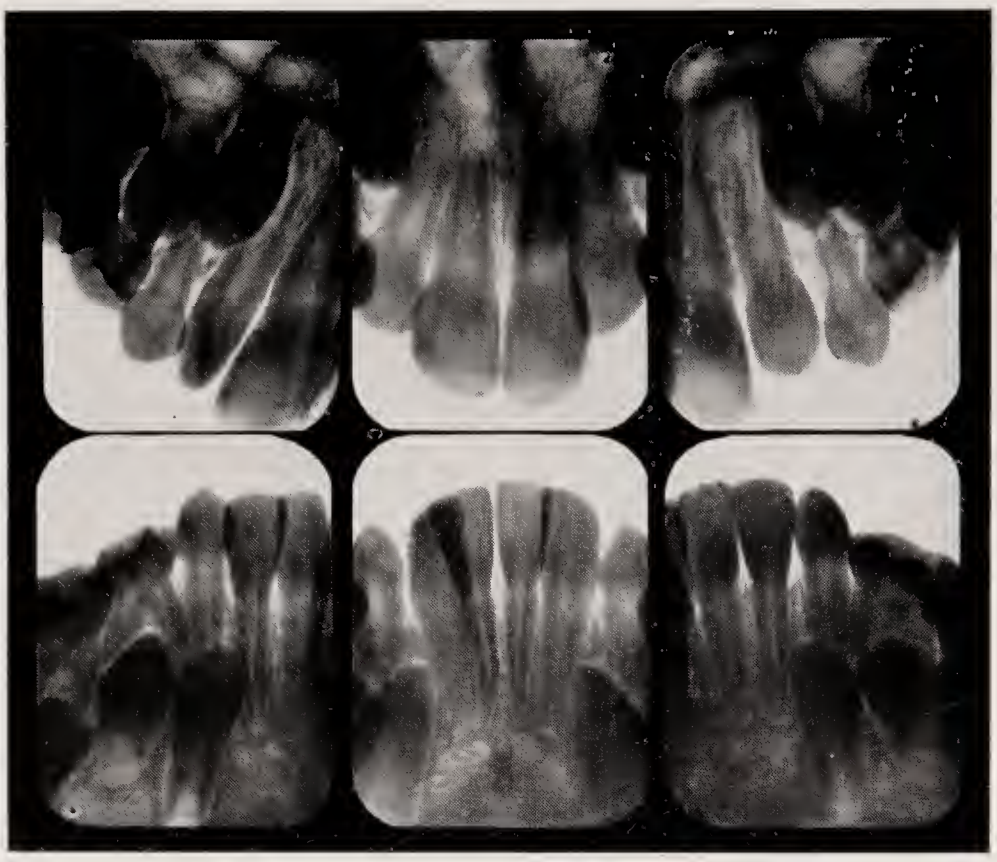


Fig. 7

Fig. 8

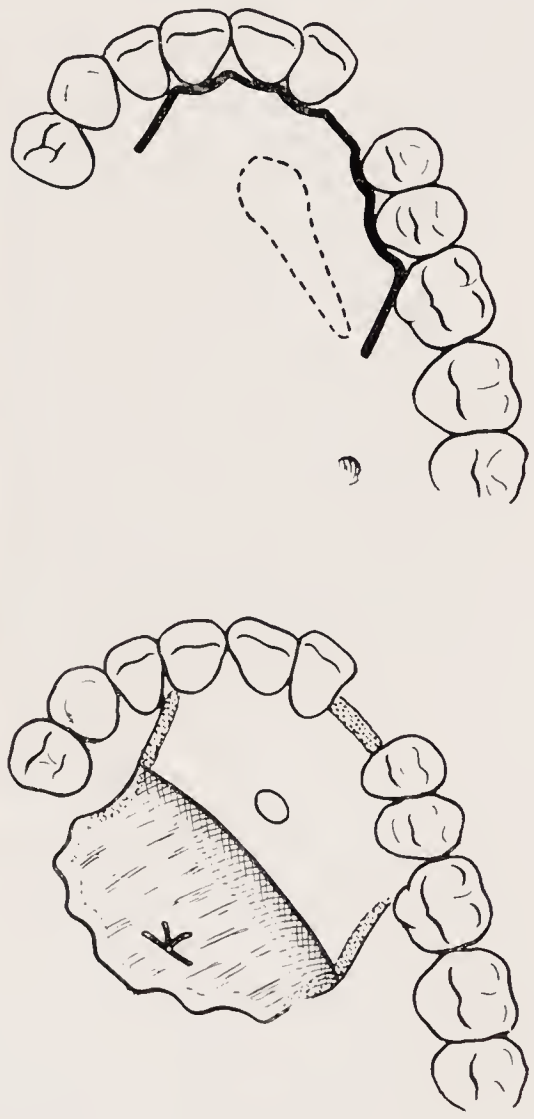


Fig. 9

could see the outline of the denticle which lay in the palate with, as quite frequently happened, the crown pointing directly upwards and the root downwards.

The diagram (figure 9) illustrated the planning of the flaps for these operations in the palate. He would ask them to imagine a

little denticle lying towards the backs of the central incisors. In order to get that out one would have to turn practically the whole palate back. He found, in practice, that it did no harm. It was absolutely necessary to get that flap turned right back from the tooth, and if it tended to spring forward one could stitch the flap back while a view of the bone was obtained. It was absolutely necessary to expose a very large area before one could get a view of the bone and before the bone could be removed.

There was another type of case, the delayed eruption of a tooth or teeth, where it had been decided to cut down on and expose the tooth. In some cases it was enough to expose the crown and remove any bone which formed an obstacle to the eruption of the tooth. Or it might be feasible to bring the tooth into place by means of traction applied after fixing a hook into the tooth. With regard to upper canine teeth, he had come to the conclusion that those misplaced and lying obliquely or horizontally with the crowns in the palate were most unlikely to descend, with or without applied traction, whereas those which, though lying nearly horizontal, had their crowns placed to the outer side of the alveolar arch, would come down very readily.

He remembered a discussion, not so long ago, in which the statement was made that the canines in all these cases, whether lying horizontally or obliquely, always came down if you gave them time—but perhaps he had not lived long enough to verify that! He thought it was the case that where they were lying obliquely or horizontally in the palate they did not get down; they got hung up, sometimes impacted against the sides of the teeth.

He had also found that in the case of deeply-placed teeth, after exposing them it was essential to keep open a channel for eruption, and not to allow the tissues to close completely over them after having removed bone. This he had accomplished, recently, by packing with gauze in flavine and paraffin at the time of operation and subsequently replacing this with a pack of gauze and zinc oxide paste, which seemed to be becoming very popular in connection with many operations of the mouth.

At a later state, a vulcanite plug could be fitted. If this were allowed to reach the crown of the tooth it served a dual purpose, as applied pressure to the crown in the right direction would encourage the tooth to erupt against the pressure. He would give them an example to show how, in favourable circumstances, one could obtain a very rapid descent of a tooth. An X-ray picture was taken, and an operation performed a few days later, for the removal of the first premolar (figure 10). A further picture was taken three months later; they would see that the canine had dropped down into its position. It was a case where the tooth was lying in the normal position, more or less well outside the alveolar arch. Next followed a case he had had, recently, at the Royal Dental Hospital, and which, clinically, was a typical cyst. Whether it was a dental cyst on one of the teeth with the erupting canine impinging upon it, whether it was a dentigerous cyst, or whether it was an eruption cyst he did not know; but, clinically, it was a cyst with a big expansion of the bone of the alveolar wall, complete with typical "egg shell" cracking (figure 11a). The case was operated on, the tooth was exposed, the outer "egg shell" removed with an apron of the cystic lining, which exposed the crown

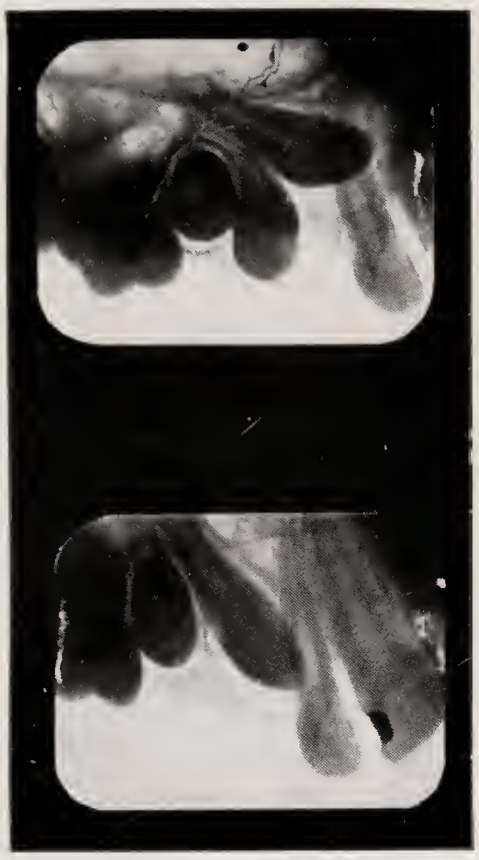


Fig. 10

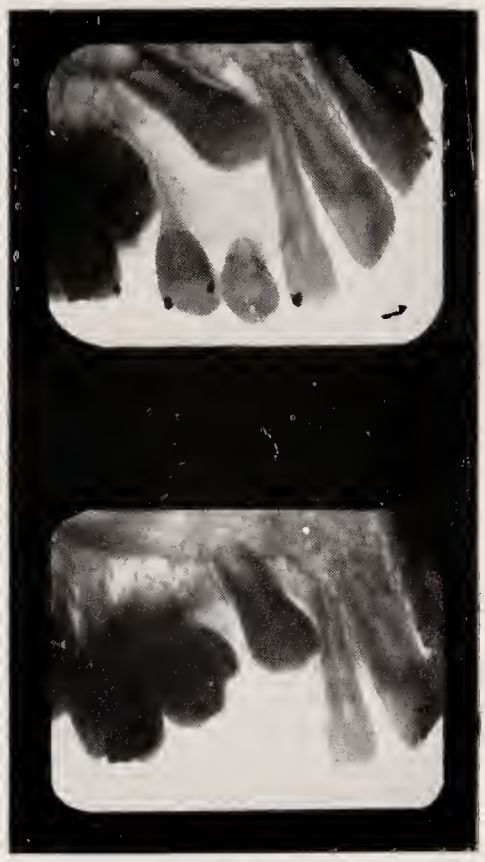


Fig. 11

Fig. 12

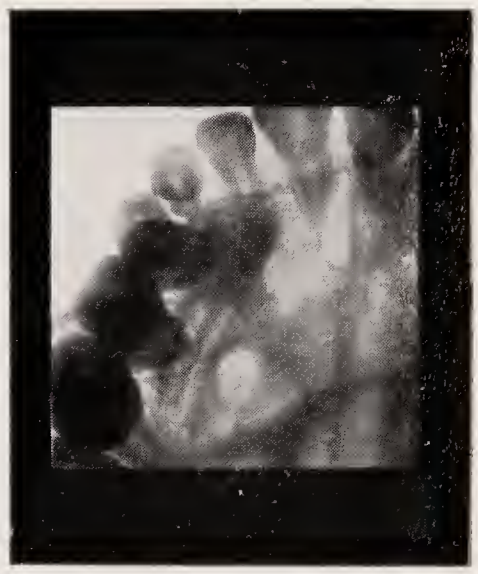


Fig. 13

in this way. He did not take any special steps to keep the wound open because he had an idea that the tooth was going to drop down quite quickly into place. However, five months later, it had moved but little (figure 11b). Only that morning he had seen the child, and the tissues had completely healed over the unerupted canine. He was going to perform another operation later on and take care that, this time, it was not allowed to heal over. He was quite sure that then the canine would drop down into position very quickly.

An occlusal view (figure 12) revealed it situated in the proper direction and not deeply embedded in the palate. That, he felt sure, would come down without the help of mechanical means.

Fig. 14

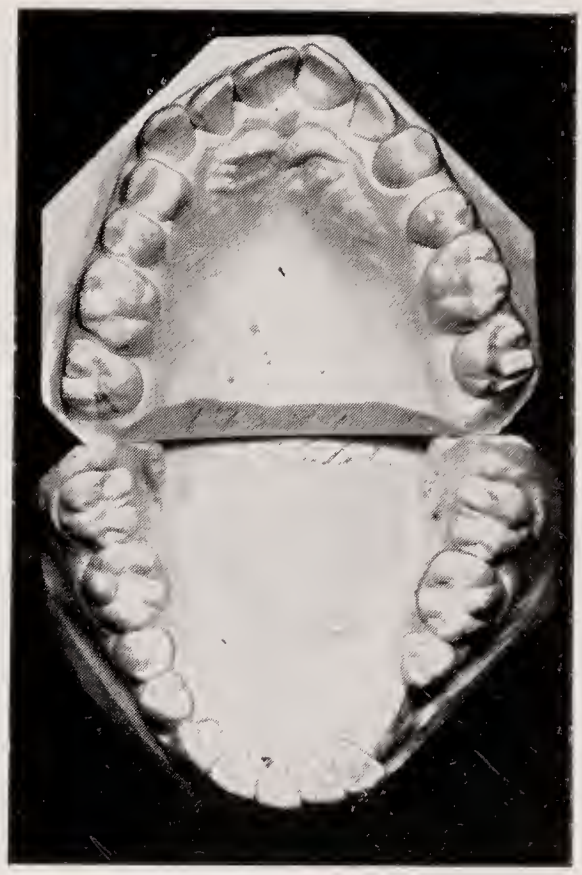


Fig. 15

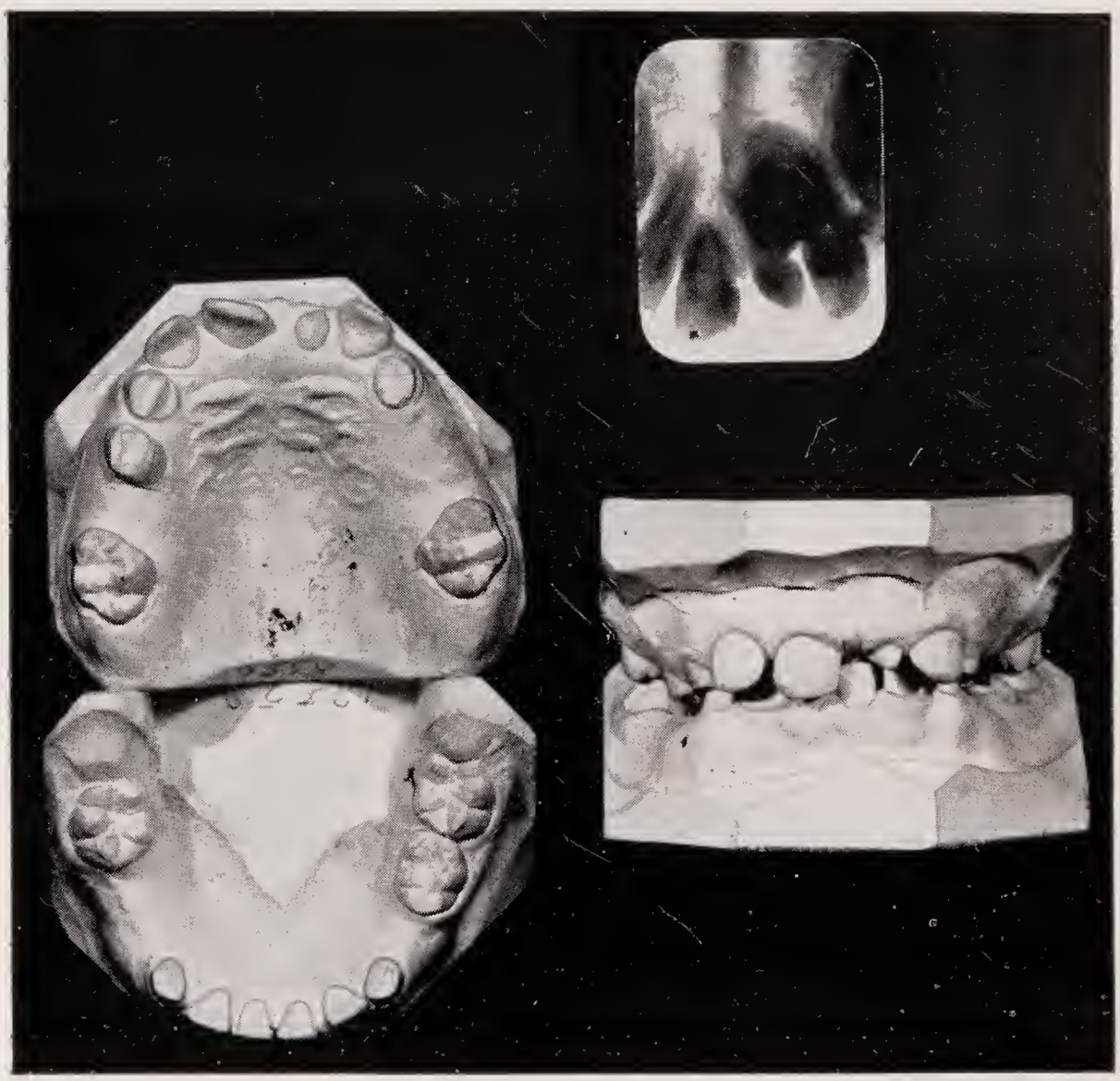


Fig. 16

Next, he would show the case of a child which, he was afraid, was quite hopeless ; it would be shown just as an example of a tooth which was not likely to come down, whatever happened (figure 13). The tooth was absolutely horizontally placed, with the root well inside the arch of the palate. In that case, one had had to advise the parent that the tooth could not be brought down, and either to await events or perform an operation to remove it. It was doing no harm at the time, and it was always possible to watch it. This was a case, evidently, which he had not considered quite hopeless in the first instance, because he had taken out the first premolar in the hopes that the tooth would descend, but as they would see (figure 14), two years afterwards there it was, in much the same position as it was when treatment was begun.

The original models were shown in figure 15. Had he perhaps studied them a little more at the time, he might have been warned not to take out a tooth, but to give up all hope of bringing down the canine. His own conviction was that the tooth could not be brought down, and he was backed up in that by most of their own experts.

Figure 16 showed an interesting case ; a little boy arrived with the usual conical supernumerary tooth and that tooth was removed the first day. The same day another X-ray was taken (figure 17), which revealed that below the supernumerary tooth there was a mass made up of two separate teeth, one being a central incisor and the other a supernumerary. At a later stage that was confirmed. The operation was performed in hospital, with a certain amount of difficulty. They were lying very deeply. The supernumerary, placed as it nearly always was, behind the central teeth, was removed. After that, the case was allowed to drift ; no attempt was made to keep the wound open, and at a later stage it was found that the central incisor was very much in the same position. All the tissues were completely healed over and they were more or less at the same place, more than a year later. Another operation was performed, and that time he packed it, and kept it packed, first with gauze and finally with a pack of zinc oxide paste, for some weeks. Appliance treatment was instituted to create enough room for the tooth in the arch. No means of traction were used at all.

A picture of the boy, taken at the end of last year, showed that the tooth was coming nicely down (figure 18). Another appliance

Fig. 17

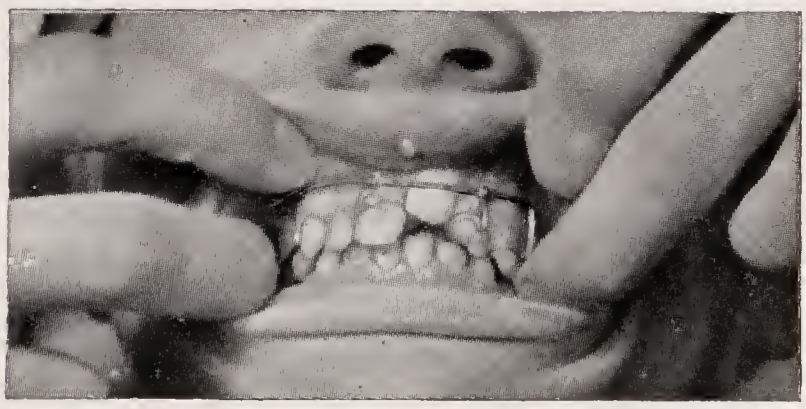


Fig. 18

Fig. 19

Fig. 20

Fig. 21

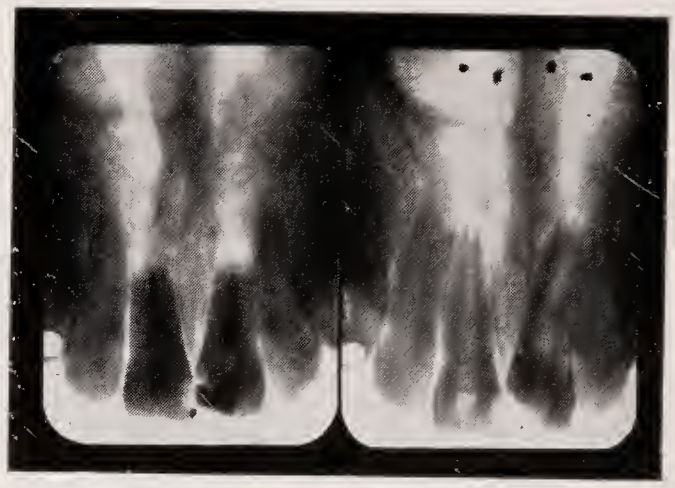


Fig. 22

was going to be put on to widen the space slightly more, and he very much hoped that the tooth would come down without putting a hook in it and applying traction.

He feared that the illustrations of the next case were not his. Although he had had a hand in the operations, he had not, in every case, had an opportunity to obtain permission from the owners to show them that night.

Misplaced canine teeth were seen in the case illustrated in figure 19. The lower premolar and lower canine were in particularly bad position. Actually, the canine was practically horizontal. One of his colleagues at the Royal Dental Hospital had taken out the first premolars, but not the slightest change followed in the position of the misplaced lower tooth (figure 20). The X-ray (figure 21) taken eighteen months after the extractions would show them that although the upper canine had come down into what was a very satisfactory alignment, the lower canine still remained in the same position. In connection with this case, he would mention that it had since been operated on further. The lower canine was exposed

and packed with gauze and zinc oxide paste. A vulcanite plug was placed so as to impinge on the tip of the canine, and there was some chance of its moving up. That was the method which he had mentioned earlier, of the use of the vulcanite plug to induce the eruption of a tooth.

Though not, perhaps, strictly an orthodontic problem, that of the fractured central incisor, or incisors, could be difficult of solution. He suggested that in a certain number of these cases apicectomy should be borne in mind. The type of case required careful selection, but, in older children especially, that treatment had proved successful, and, as far as one could see, had avoided the alternative of extraction.

Such a case was shown in figure 22. A boy of 14 had damaged the central incisors, and, although it seemed hopeless, the parent begged him to do his best to save the teeth ; he really wanted to extract them. The boy was admitted to hospital, and the entire operation was done on both teeth, including the treatment of the root canals. Previous to operation, both teeth discharged very freely from the canals, and had to be drained and disinfected as far as it was possible to do so ; for three weeks afterwards, they were so loose that he expected every day to have to take them out. He saw the boy a fortnight ago and the teeth were absolutely firm. How long they would remain so, of course, he did not know. The wound under the lip had healed up absolutely. In his opinion, carefully selected, this type of treatment was justified.

With regard to operations on the frænum, it was now generally agreed that the influence exerted by an abnormally placed frænum labii in bringing about and maintaining spacing between the upper central incisors was almost negligible.

A case which he had described some years ago might be of interest to them. The patient was a girl of ten ; when first he saw her she was wearing a retention plate which carried a small hook arranged to pass below the incisive edge of the left upper central incisor. He was told that when this tooth first appeared it came through the gum pointing horizontally forward. An appliance had been worn to bring the tooth down into its correct position, and when he saw the child the tooth was in almost normal alignment. Whenever the retention plate was not worn for a day or two, however, the tooth at once began to travel out again, and the girl had some difficulty in getting the plate in on those occasions. On examination, he discovered that the frænum was attached to the gum directly over the centre of the incisor concerned, the attachment extending to the gingival margin. He separated the frænum from its attachment to the gum over the root of the tooth and removed the portion thus set free. The retention plate was not worn again and the tooth did not relapse. He felt convinced that this particular case was an instance of cause and effect.

The next case was an old one, recorded at the Royal Dental Hospital, he thought, in 1927. The abnormal frænum was attached from the gum margin, over the bone. He removed that, and the girl did not wear her retention plate again. She had still got her tooth, and one would not know, now, that she had ever had that little adventure.

He had seen another case in which the labial attachments of the frænum involved the margin of the upper lip and gave rise to a deformity sufficiently noticeable to disturb the parent's peace of mind. That case, however, had been easily dealt with by a simple plastic operation.

Perhaps it would sound a little far-fetched to include gingivectomy in his list, but as an adjunct to orthodontic treatment it had a place. He remembered one case of hypertrophic gingivitis treated in that way, in which the patient subsequently wore appliances which could not, otherwise, have been tolerated.

Concluding, Mr. Riddett said he had already trespassed enough on the time of the meeting, and would say no more except to apologise again for such an inadequate performance, and make way for the real business of the evening. He should also like to apologise to those members, some of whom might be present that evening, whose material he had had to use, because the time at his disposal was so short, without previously asking their permission ; he hoped they would forgive him.

Mr. CHAPMAN said that before Mr. Sowden Hills gave his paper he would like to propose a cordial vote of thanks to Mr. Riddett for his address. He, for one, had been extremely interested in it. Mr. Riddett had mentioned many topics which had been passing through, his, Mr. Chapman's head, for some time, and on which he had now received much enlightenment. He could not but feel that there were many others who equally appreciated the President's address. Even had Mr. Riddett had more time to prepare it, he doubted whether he would have succeeded in entertaining them more. He had very great pleasure in proposing to their new President a most hearty vote of thanks for his thoughtful and illuminating speech.

In acknowledging the vote of thanks, the PRESIDENT said he was very much relieved now that he had given the Presidential Address. He then called upon Mr. Sowden Hills to deliver his paper.

An Acquired Forward Position of the Mandible as the Result of the Early Removal of the Deciduous Molars *

By W. A. SOWDEN HILLS, L.D.S.Eng.

THIS subject of the forward movement of the mandible, presumably as the result of the early removal of the deciduous molars, has I *now* know been studied by others, but in presenting this to you I want you to know that this investigation was made by me entirely without the knowledge that others had noticed this condition.

My observations, deductions and conclusions are therefore quite my own, and so you will hear my own view unhampered by the observations of others.

* Delivered before the Society, 6th February, 1939.

Before I commence to give you my observations there is one matter to which I must draw your attention ; as an assistant dental officer it was quite beyond my means to employ professional photographic services for the taking of the photographs and the making of the lantern slides, and so they are entirely my own production. I want you to bear with me and forgive the imperfections which you will observe.

For the last two years I have been at Croydon as an assistant dental officer, and as the dental scheme embraces a large orthodontic scheme, and also includes the treatment of pre-school children, I found my attention quickly drawn to a condition of the occlusion of certain small children, and later older ones, when I had recognised the young children's condition and had drawn my conclusions.

As many of my sessions are devoted to work other than education sessions, I rarely go out to the schools, and this has been a matter of regret to me from the point of view of obtaining further data relating to the number of children who can be found with this condition of the forward movement of the mandible.

I therefore cannot give you statistics of the percentage of children at Croydon who present this state of their dentition, but I have sufficient data to be able to present to you what I have found.

You inspect a young child of, say, 5 or 6 years of age, that is, on his entry to school, and you find that all the deciduous molars have been removed, and perhaps also the upper deciduous incisors. Examination of the occlusion may show that the child has closed its mouth so that the mandible has moved forward and upward in such a way that now the lower deciduous canines are definitely anterior or mesially to the upper deciduous canines, and that the tips of the lower canines are touching the upper gum mesially to their opponents. This is the typical picture which you will find of the condition in its original state. I am going to call it the primary condition.

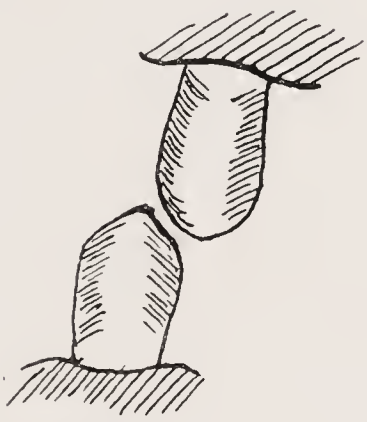


Figure 1

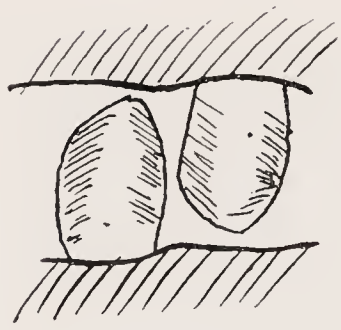


Figure 2

Figure 1 is a drawing of two deciduous canines, an upper and a lower on the left side of the mouth.

It shows their normal occlusal relationship.

If you examine the distal inclination of the lower one and the mesial inclination of the upper, you will see that they are two inclined planes which can pass along each other's surface. If a pressure is applied upwards to the movable tooth, i.e. the lower, then the only path along which it can move will cause the mandible to move forwards and upwards into the position shown in figure 2.

I shall give you instances of this primary condition, as I call it, and also show you the results of delayed treatment, which I classify as second and third stages, conditions which might lead one into considering them to be cases of congenital inferior protrusion, and I will draw your attention to my acid test as to whether they are congenital or acquired.

For these canines, or should I say the mandible, to travel like this there must, obviously, be no obstruction to prevent them. By that, I mean there cannot be any posterior teeth in occlusion, though you will find later that I shall describe a case of pre or mal occlusion with no closed occlusion and with posterior teeth present. It would appear that the upper deciduous incisor teeth can act as an obstacle to closure, and I was surprised to find that this was so, when one remembers that the long axis of the lower deciduous incisors is vertical, more vertical than that of the upper deciduous incisors. One might, therefore, expect in most cases the lower teeth to force the uppers outwards and so the latter would give way under the stress of a forced closed occlusion. I quite appreciate that the forward movement of the mandible might clear these upper teeth, and that they have done so I shall show you.

Just one word before I go on. I do not want members to think that that is the result of wholesale extractions by dental officers, because that is not true. These children are seen with this condition at their first dental inspection, and as the pre-school treatment at Croydon until recently has been insignificant in amount, it remains to be known where these extractions are performed.

In one school, a poor school, I found 35 children showed this condition out of 145. And where would poor parents take their children? May I very tentatively suggest the general hospital?

Figure 3

Figure 4

The models illustrated in figure 3 show this typical condition of the deciduous canines and the position of the mandible. It is as I showed you in the drawing. When the permanent molars erupt, as they have done here, the condition will remain the same because they become opposed before they are fully erupted. The molar occlusion may be very varied. There is nothing new which will induce the mandible to return to its normal position.

The reason for the varied molar occlusion is, that I found that in many cases not all the posterior teeth were removed at the same time, the consequence being that the first permanent molars could move forward or tilt at different times. I have observed molar occlusions which were postnormal on one side and prenormal on the other, as you will see later on. I, therefore, soon gave up keeping records of the molar occlusion, as it really has no bearing upon the ætiology of this condition other than unfortunately not being present to avoid the closure of the mouth.

Figure 4 gives another example of the condition. At first glance you would be inclined to say that it was obviously a case of congenital inferior protrusion, but an examination of his mouth and jaw movements would show that it was not so, as this little boy can easily retrude his mandible. Owing now, however, to the uncomfortable position of the occlusion he could not keep it retruded, and the only way he could obtain a position of rest was by moving the mandible forwards and upwards. The front view of his models in this last position is shown in figure 5. The right side is seen in figure 6. This view is interesting, in that the upper deciduous molars are still in situ. This does not help him at all, but it helps me in showing you that the case is definitely not a condition which has occurred as the result of the distal movement of the upper deciduous canine which might be expected from our knowledge of tooth movements where the upper deciduous first molar has been lost.

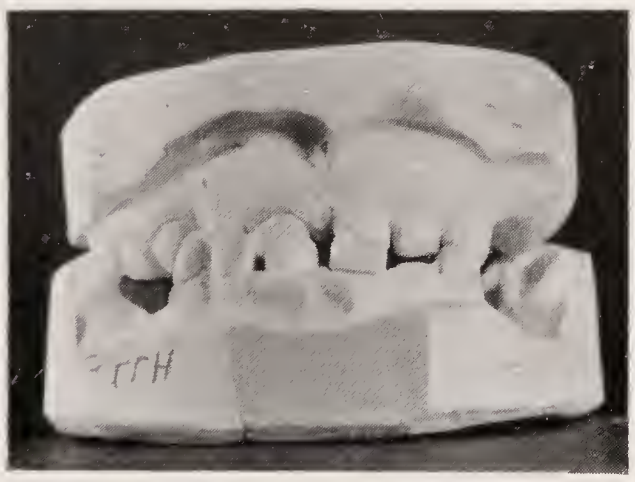


Figure 5

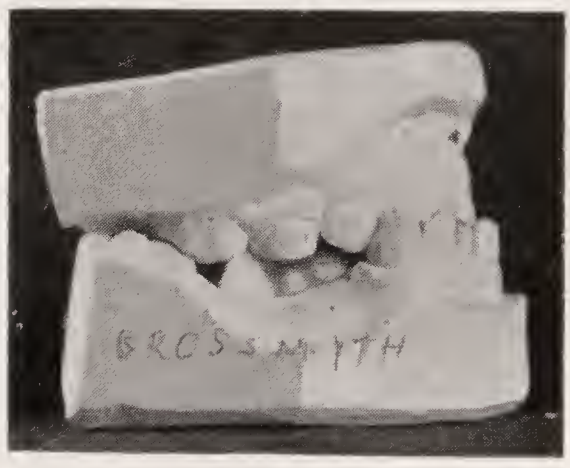


Figure 6

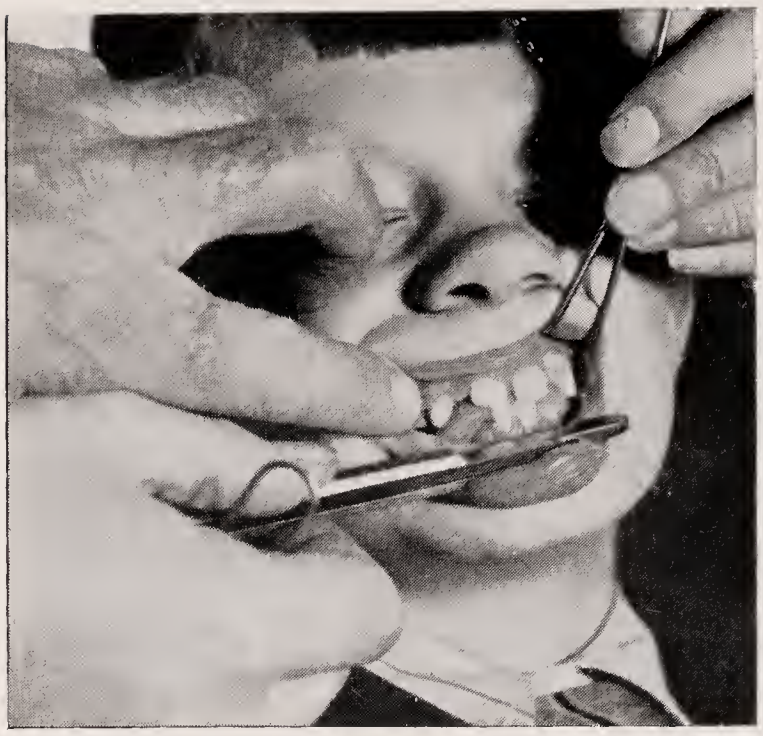


Figure 7

Figure 8

I wish you to note the result of treatment of this boy in figure 7, where the antero-posterior relationship is now normal, and in figure 8, where his profile should be compared with figure 4.

At the time the original models were taken the lower first permanent molar had erupted, and was occluding with the second deciduous upper molar teeth. It will be realised that when the first upper permanent molar erupts the occlusion will be prenormal. It would be prenormal if both molars erupted at the same time in the jaws. In this case, however, it is possible that the occlusion will be still more prenormal as the result of the movement of the lower molar tooth, this movement depending upon the time of removal of the deciduous molar teeth.

As I said, this is a typical case, though it varies a little with regard to the upper deciduous incisors, as you have noticed that the lowers have passed forward and are now labial to the uppers. This is not usual, but you will see later that it is usual in the permanent dentition if the condition is untreated.

I have mentioned that the ætiology of this condition is presumably due to the early removal of the deciduous molars and, while still thinking so, I must draw your attention to another factor which can be taken into consideration as being possible to produce this condition. This state of affairs can actually be observed, in a very few cases, where there has been no removal of deciduous teeth, but to no extent like the number of times it is noticed after the deciduous molars have been removed. In trying to explain this factor there are two considerations to be remembered: (1) the occlusal plane of the deciduous teeth, particularly the molars, and (2) the act of mastication.

Dealing with the occlusal plane of the molars, you know that a deciduous dentition viewed from the side shows the occlusal

plane to be practically a horizontal line instead of a curve, as seen in the permanent dentition. This would allow a free sliding movement in a horizontal plane of the mandible against the maxilla.

In the act of mastication (the second consideration), the mandible is first protruded and then drawn upwards and backwards. I suggest that the combination of these two movements might, and could, produce a prenormal occlusion. In those cases where the deciduous molars had been removed, then the second of these factors might come into play ; that is, the before backward movement, and the child would most naturally bring the lower deciduous canines mesially to the uppers and through tooth movement eventually find a position of rest in a prenormal occlusion.

Now, before I go on to describe this condition associated with complications where the permanent teeth have erupted, let me mention a cross-bite state which at times occurs.

I have just mentioned that when the little boy tried to close his mouth, he found the canines in the way, and so moved his mandible forward. But a number of cases not only moved the mandible forward, but at the same time laterally. They appeared to find a more comfortable position than in having to push their mandible right out.

The side view of models of a little girl are shown in figure 9. Observe the relationship of the right upper and lower deciduous canines. The lower is situated anterior and *laterally* to the upper.

The following two figures are particularly interesting, in that they were taken as you will see, of the teeth in situ. This cross-bite condition is well illustrated in figure 10. It is the only position of rest for the boy, with the right upper deciduous canine well lingual and distal to the lower.

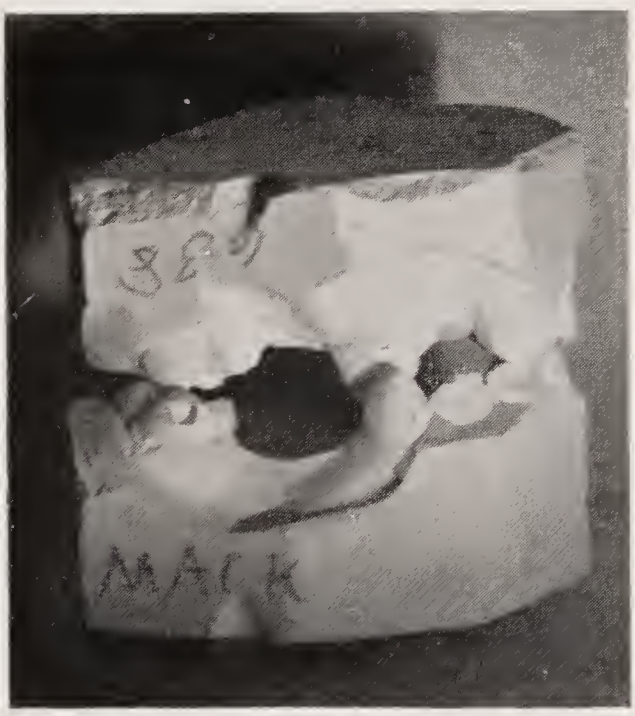


Figure 9

Figure 10

Figure 11

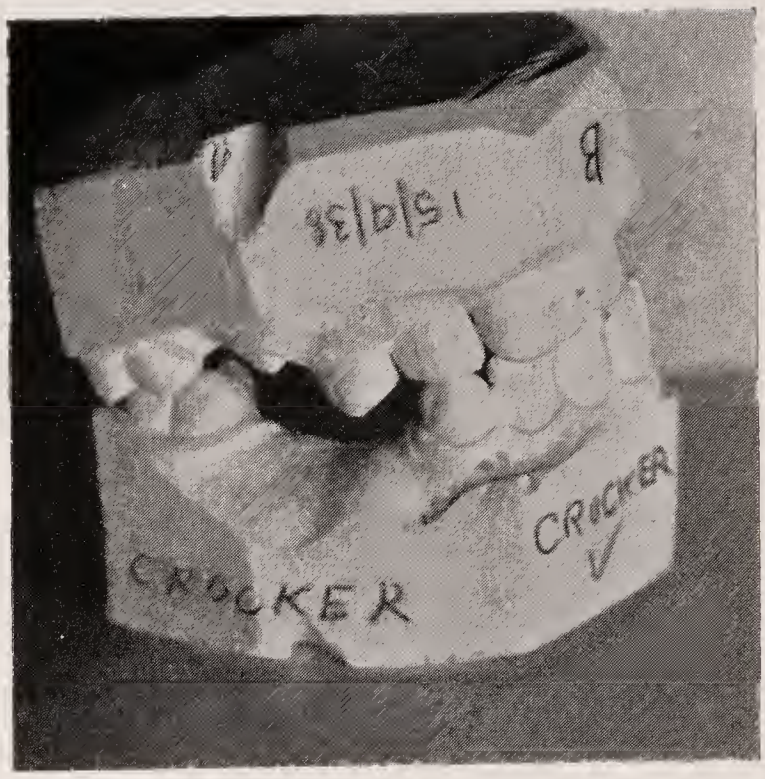


Figure 12

Figure 13

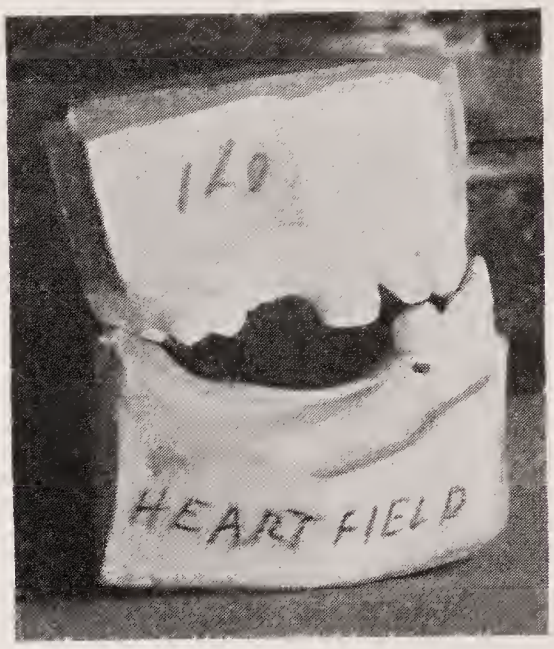


Figure 14

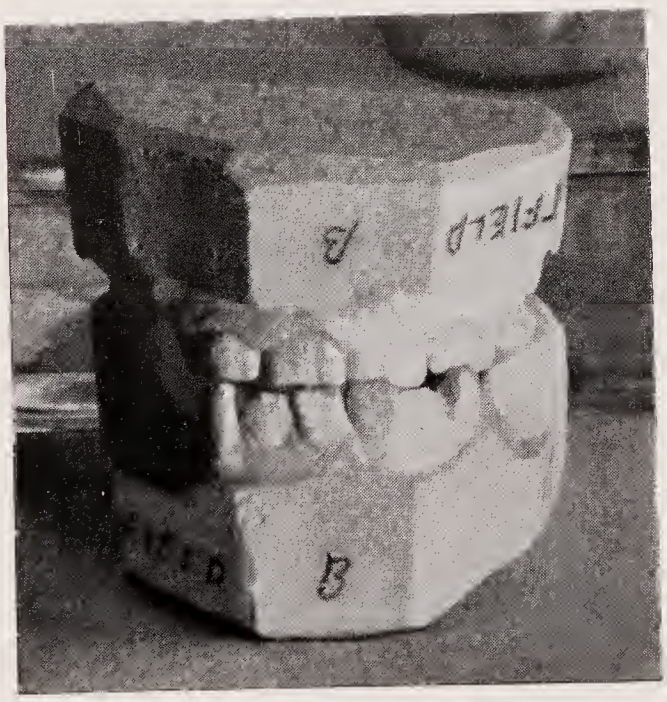


Figure 15

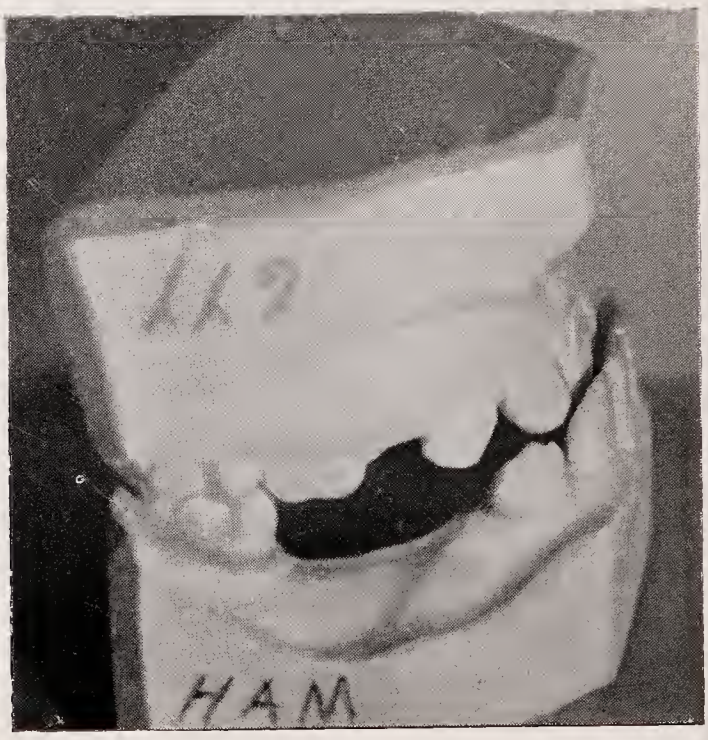


Figure 16

He is seen trying to close his mouth in figure 11 in a position of central retruded occlusion, and you will notice that his canines touch tip to tip. Why do they occlude tip to tip? These upper deciduous canines when standing alone would be expected to move distally, and I take it they do. And they also move lingually, as examination of the mouth or models show. The lowers, I take it, would also move distally, *but*, in order to arrive at a tip-to-tip occlusion, the lowers must move distally faster than the uppers, regardless of whether they collapse lingually or not. And how can the lower deciduous canines move distally faster than the uppers when they are all the time in an advanced mesial position to the upper? I should like to hear your views on this question.

I am now going to return again to the stage where there is no cross-bite condition present. It must be obvious that when the permanent incisors erupt that irregularities are going to be met with. It may interest you to appreciate the types of complications which can be met with and it is possible that one could be misled as to the ætiology of them when the deciduous canines have eventually been lost.

If the mandible is held forward as I have shown, the trouble which will ensue will be that of abnormality of position of the permanent incisor teeth. You would expect that the lowers would erupt labial to the uppers. That is what occurs with some or all of them. All things being equal, the molar occlusion is dependent upon the incisor abnormality, and it should return to normal upon resolution of the canine and incisor condition.

Figure 12 shows a condition which I describe as the second stage. The lower deciduous canines have already been lost, but not removed by me. The permanent incisors are in an edge-to-edge occlusion and the mandible in a retruded position.

The models in figure 13 present the same stage with the deciduous canines in a typical position, and it gives rise to many thoughts as to tooth movements which I shall make mention of a little later.

Then we have the third stage where the permanent maxillary incisors are definitely erupting behind the lower incisors. In figure 14 you see a case where the mandible has moved forward still more, and the lower deciduous canine is well mesial to the other; that is, is not touching it. This has occurred on account of the pressure of the erupting permanent incisors. The prognosis is not good, as this pressure will force the mandible forward still more with marked irregularity of the incisors.

The front view of the same case is seen in figure 15, and I want you to note how the right lower deciduous canine has forced the right upper permanent lateral incisor labially.

Figure 16 shows a still more advanced condition, as seen from the right side. To me this is an illuminating picture. The right upper second deciduous molar is still in situ. This means that the first permanent upper molar cannot have moved more forward, if it has moved at all, than the deciduous molar has permitted it. As seen in the figure, the right lower molar is practically in normal occlusion with the upper. When, however, this boy retrudes his mandible, *as he can*, until his incisor teeth touch edge to edge, then the molar occlusion is postnormal. The maxilla gives the

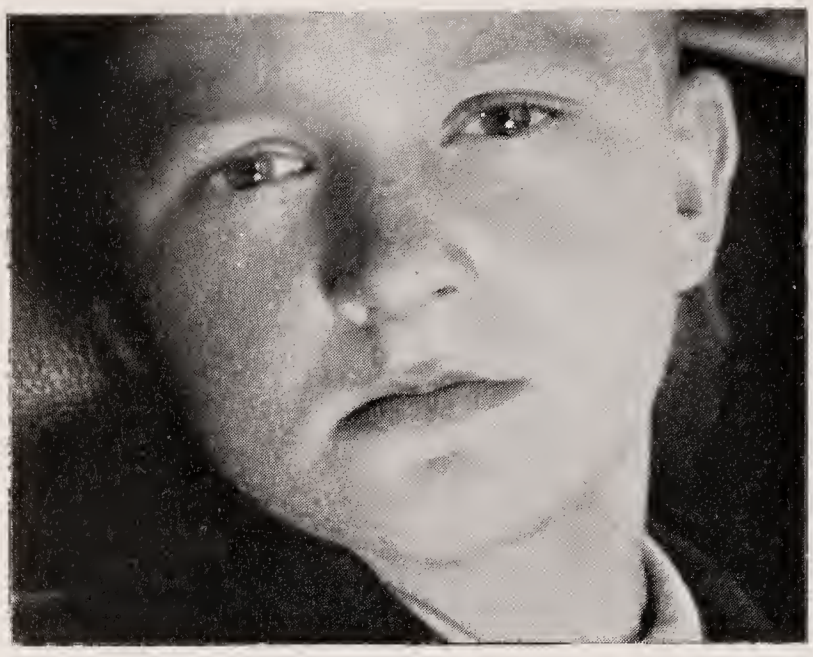


Figure 17

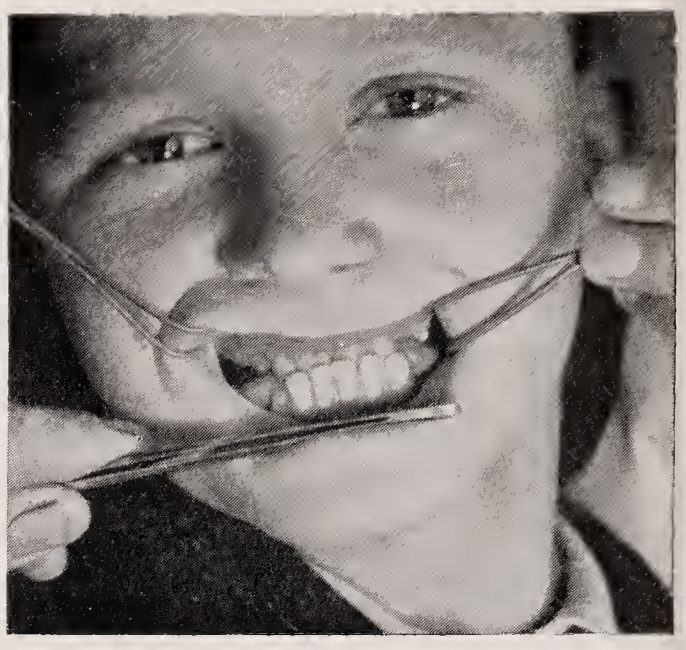


Figure 18

Figure 19

Figure 20

appearance of being foreshortened, but it is an illusion due to the pressure distally of the upper incisors, while the mandibular incisors are splayed out labially.

Figure 17 is a photo of the boy himself with his mouth closed. You can see how his lower lip stands out, reminding you of the other boy I showed you, though there it was due to the protruded position of the deciduous teeth. The occlusion is shown in figure 18. The next two figures, 19 and 20, show the improvement after treatment.

I wish to stress that all these children can retrude the mandible, in most cases to an edge-to-edge occlusion, showing that a position of rest would normally be one in a more retruded position, and that these cases are not ones of congenital inferior protrusion. In the latter no retrusive movement is possible. To me this is the acid test for differentiating between an acquired position and a congenital occlusion.

Earlier I discussed a case, figure 6, where the right upper first deciduous molar was in situ, and from that I contended that the right upper deciduous canine could not move back for the lower canine to rise mesially to it. I have stated that this prenormal occlusion is due to the early loss of the deciduous molars, but must it of necessity include all the deciduous molars? Suppose that the first deciduous molars only were removed? Will the prenormal occlusion follow? Curiously enough, the answer is *yes*, *no*, and *yes apparently*.

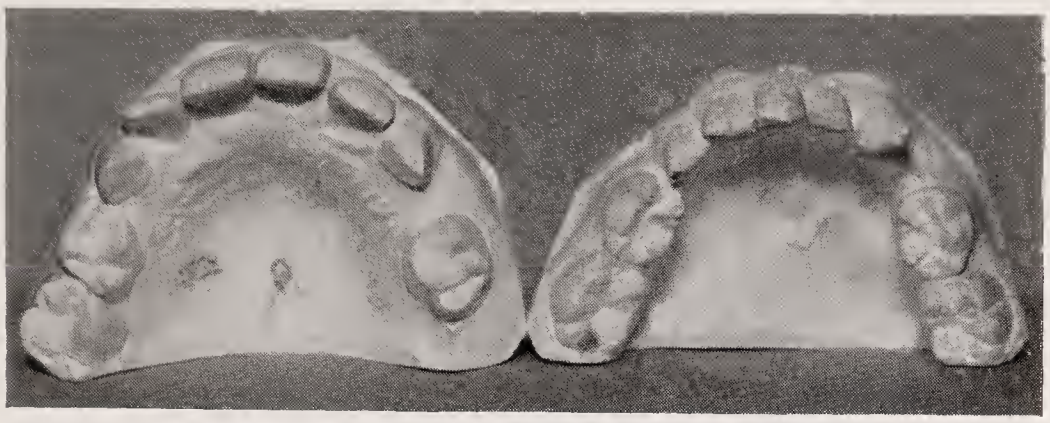


Figure 21

Let me show you an example of the answer *no*, i.e. that prenormal occlusion does *not* happen. Figure 21 shows the models of a child aged 9 years. When $5\frac{1}{2}$, the first deciduous molars had been removed. Where is there room for them now except on the upper left side. The deciduous canines, where present, are touching the second deciduous molars. What has happened? I suggest that the deciduous canines and the incisors have collapsed, and that the second deciduous molars have moved forward. You will also notice the spacing and rotation and labio-version of the permanent laterals.

The models are articulated in figure 22. The occlusion of the second deciduous molars and the first permanent molars on the right side is normal. The upper deciduous canine stands up against the second deciduous molar and against the permanent lateral incisor, the latter position being as one would expect. The right lower deciduous canine tooth is missing, but you will appreciate that the deciduous canine occlusion would have been normal in spite of the loss of the deciduous first molars. The mandible has neither moved forward, nor has the occlusion closed, which constitutes the answer *no* to my question.

In figure 23 are the models seen from the left. Unlike the right side, there is a space for the first upper deciduous molar, whereas in the mandible the space has completely closed, as is seen on the other side.

It is interesting to attempt to deduce a reason for the non-movement of the upper deciduous second molar and non-collapse

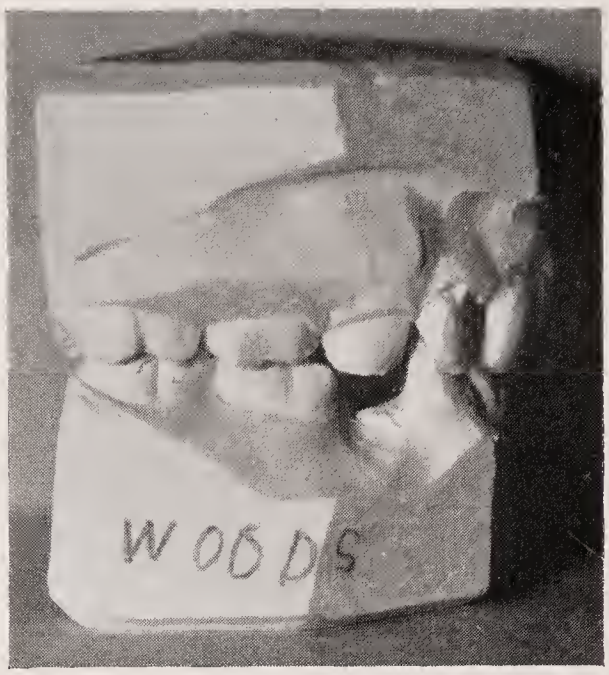


Figure 22

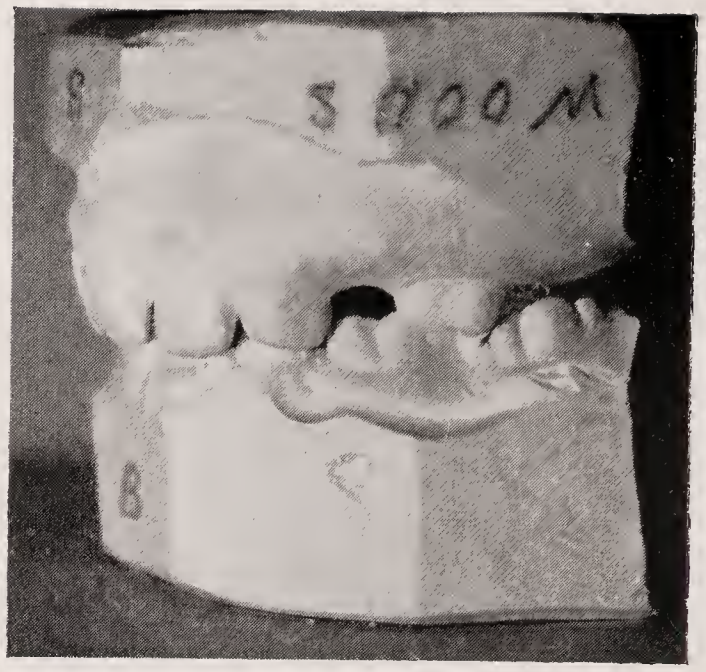


Figure 23

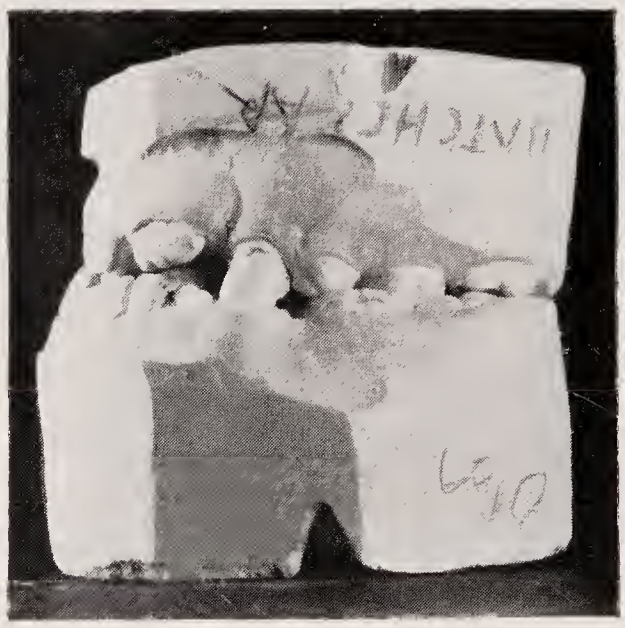


Figure 24

of the upper canine. The movement of the lower canine may be due to intrinsic movement of its own, and intrinsically due to the pressure of the erupting incisor teeth. The molar occlusion is going to be prenormal.

The answer *yes* to my question has really already been given with my first figures. Figure 24 shows a case of a prenormal position without a closed occlusion. Here the lower first deciduous molars have been removed, and the child has moved its mandible forward so that the lower deciduous canine has now risen mesial to the upper deciduous canine. Further, the child is cross-biting, and the permanent incisors are erupting edge to edge. As already shown, the upper deciduous canines cannot collapse owing to the presence of the upper first deciduous molars. It may occur to you to wonder why the child moves its mandible forward at all. There is only one explanation that I can see. The lower deciduous canine tends to drift distally and to rise, thus forcing the child to move its mandible forward.

In explaining the answer *yes apparently* to my question, you will appreciate that in figure 14 the mandible should not be in a prenormal position, yet it appears to be so. If the upper deciduous canine moves distally, then the lower canine appears well mesial to it and gives the impression of a prenormal occlusion without any actual movement forward of the mandible. I am surprised that I do not see more cases of this condition. As already stated, the acid test of an acquired prenormal occlusion is whether the mandible can be retruded or not.

Mr. Chairman, Ladies and Gentlemen, that closes the description of my investigation on prenormal occlusion presumably acquired as the result of the early removal of the deciduous molars, but before I close I would like to make a deduction or two from the result of this investigation, and give a brief outline of the principles of treatment to be adopted.

This possibility of a prenormal occlusion has made me wonder whether our treatment of the deciduous dentition is all that it should be. Some while back a paper was read on school dentistry, and the author stated that no regard should be given to the first deciduous molar, and that it should be removed if it showed the slightest decay. As far as I remember, he mentioned decay of one millimetre in depth qualifying the tooth for removal. The conclusion I have drawn from my research here is that the deciduous molars should be preserved at all costs to avoid this condition and to prevent the mesial movement of the first permanent molar. In fact, I would suggest that to conserve the deciduous dentition is of paramount importance.

It is important also to open the occlusion so that the mandible is able to retrude itself. See that the deciduous canines are not in contact, and so allow full eruption of the permanent molars later. Unfortunately, this only applies to those cases seen early, before serious abnormality of position of the permanent incisors has occurred. Then, naturally, more extensive orthodontic treatment becomes necessary.

Any form of shortening of the deciduous canines cannot be allowed, as it would in no way overcome the closed occlusion so often associated with these cases of prenormal occlusion.

Discussion

The Chairman said they had had a very interesting paper, in which Mr. Sowden Hills had gone into the question exhaustively and deeply. There was one point on which he thought he could reassure Mr. Sowden Hills and that was, that he need not apologise for his slides, because they had conveyed to him very clearly the meanings which he presumed they had been intended to convey.

He might remind members that the Society was prepared to pay for the preparation of slides where members wished to avail themselves of the opportunity. He then invited Mr. R. E. Rix to open the discussion.

Mr. Rix said that Mr. Sowden Hills had put before them, that night, in a most interesting paper, a condition which was now creating a problem for institutions carrying out orthodontic treatment. In opening the discussion, he would like to say that he was in entire

agreement with the main contention of the paper, namely, that it was possible to produce a postural prenormal occlusion by the early extraction of deciduous molars. The children who suffered most were those taken from the poorer classes. Prenormal occlusion had a distribution governed by social or economic conditions. Dental surgeons in good practices in, say, our cathedral cities, would tell you that they very seldom saw the irregularity. Yet Mr. Sowden Hills saw it almost daily. He (Mr. Rix), at Guy's Hospital, saw it in one out of every ten orthodontic cases applying for treatment. Even postnormal occlusion was only twice as common there. He wondered if Mr. Sowden Hills had any figures to show the number or percentage of prenormal occlusion cases that had previously had multiple extractions of deciduous cheek teeth. Figures, he was sure, would convince the most obstinate sceptic. In a group of 50 consecutive prenormal occlusion cases which he had collected at Guy's Hospital, 42 had had multiple extractions of deciduous molars before the age of seven years. Of the eight left, who had had no extractions, no less than seven had a family history of prenormal occlusion. Another interesting figure obtained from the group was the percentage of children with multiple extractions who gave no family history. It was 97 per cent. He would have liked to have heard more from Mr. Sowden Hills of the conditions which he thought must be present to create that prenormality. After all, a great number of children had deciduous molars taken out and yet, they all knew that not every child went into prenormal occlusion because of that. At Guy's, something like 60 per cent of all orthodontic cases he saw had been aggravated by, or actually created by the early loss of deciduous molars, but only 10 per cent were prenormal. He was not sure whether Mr. Sowden Hills had brought out clearly the mechanism of the production of the prenormality, and he did not know whether he agreed with all the points which had been mentioned. In his opinion, there was a definite chain of events which led to the deformity.

(1) First it was seen that the extractions of the deciduous molars took place some time not later than the age of seven. The upper and lower permanent incisors had not then had time to erupt sufficiently to establish a normal incisor overlap. The first permanent molars were not fully erupted.

(2) Secondly, the arch relationship before the extractions was normal in the antero-posterior direction. If a postnormal occlusion was present, pre-normality did not develop. It was only the lower dental arch which was advancing normally relative to the upper that overslipped the mark so easily.

(3) Thirdly, one found that a sufficient number of deciduous molars had been extracted to cause a grave loss of occluding area, and thus caused a loss of resistance to the bite. There was nothing to prevent the mandible closing up a little too far, and by its very shape and inevitable path of movement it came a little too far forward in relation to the upper.

(4) Lastly, there was a fourth aggravating factor which caused the already overclosed and slightly prenormal mandible to be guided still more forward at the very moment of closure. It was caused by the way the upper and lower temporary canine teeth over-rode one another excessively, and their deflecting cusps thus slung the mandible forward.

Perhaps by the routine taking of models of children, Mr. Sowden Hills would be able to produce a set of models before and after extractions which would produce the final link in the chain of evidence. The best that he (Mr. Rix) had been able to procure were illustrated in a paper on the subject which he read a year ago at the Royal Society of

Medicine. But by far the most convincing set of models had been produced quite unwittingly by Milo Helman in the February, 1937, issue of the *American Journal of Orthodontics*. It was perfect in every detail, but he missed the significance of the early extractions. He was too busy discussing other problems. They had been fortunate in getting Mr. Sowden Hills to present his paper to them, as his time was spent among the very class of children who produced the highest incidence of prenormal occlusion, and his powers of observation had gone to producing a very valuable paper.

Mr. F. Bocquet Bull said he thought there was one condition which Mr. Sowden Hills had not actually mentioned, and that was the condition where you had an edge to edge bite. Obviously, if you had the teeth—the deciduous teeth—extracted, and all support was taken away from the back of the mouth, three things could happen. One was, that the incisor teeth remained as they were ; the second was that the lower incisor teeth bit on the cervical margins of the upper incisor teeth, or even on the palate itself ; or, thirdly, that they overlapped the upper incisor teeth. To a very great extent, he thought, that where one originally had an edge to edge incisor bite that the easy forward movement that the mandible possessed allowed the lower incisor teeth to slip up in front of the upper incisor teeth. That was the logical thing to expect. There was one other thing, he thought, regarding treatment, which Mr. Sowden Hills had not mentioned, and that was, where, after opening the bite one frequently had necessarily, in retracting the lower incisor teeth, to extract a premolar tooth on either side, because, when the lower incisors came in front of the upper incisors, they acted, in many cases, as inclined planes in the wrong direction, the lower incisor teeth being forced forward and the upper incisor teeth, back. It was quite easy to get incisor teeth forward but it was not so easy to get lower incisor teeth back if the teeth distal to them had moved forward, and, therefore, to correct that deformity, one had to extract the premolar teeth on either side of the lower jaw. He thought the great point of the paper was the enormous amount of orthodontic treatment that had to be meted out as a result of the extraction of these temporary molar teeth. In most cases, the mistake made was that when these temporary molar teeth were extracted no means were taken to retain the bite in its normal position, nor retain the first permanent molar teeth in their normal position, and he thought that this was a point on which the Society might almost venture upon a programme of propaganda. He was quite certain that if it could impress upon every dental surgeon in the country the necessity for taking some means to remedy the loss of temporary molar teeth and point out the extent of orthodontic trouble that would be saved thereby, the Society would probably do far more good for orthodontics than anything it had done so far.

Mr. Downing, in thanking Mr. Sowden Hills for his paper, said he would like to have the matter discussed from the point of view of work in a provincial hospital. They had, he said, 100 new patients each week to see. They had, he supposed, about 200 patients a year under the age of four who had all the temporary molars extracted. There was no possibility of saving them. He did not think there was any prospect of orthodontic treatment afterwards, as far as he knew, in Leicestershire. These cases were absolutely unsaveable. What he would like to know was, whether they should do any better if they extracted all the teeth. In most cases, he, himself, extracted the upper canines.

Mrs. Lindsay said she had been very interested in the paper, and would like to suggest that the child put its jaw forward before the

teeth were extracted on account of the pain. The pain made the child push the jaw forward before the teeth were extracted and it was not always the extractions that created the trouble. She had a case in mind which started as a postnormal occlusion and ended as an edge to edge bite. As they knew, under anæsthetics when one wanted to improve breathing, one pushed the lower jaw forward, and the child did that naturally when there was respiratory obstruction. The condition might have begun before the extraction of the teeth, this operation being a contributory factor.

Miss WOLSAX, apologising for the fact that she might not be able to say clearly what she had in mind, as she did not speak English very well, said that she came from a school department where they separated the genuine abnormalities from those arising as a result of extractions. After the extraction of deciduous teeth they put in space retainers, and she thought an ordinary ring with a wire attached to it could be mass produced and the ring be made in certain ordinary sizes of molars. The dentist would just have to bend the wire over at the end of the gap. If a device like that were produced, every dentist could easily use it and so prevent a lot of harm being done. In the lower jaw the molar basis was much stronger than in the upper jaw, and more likely to collapse in the upper jaw than in the lower jaw. When the upper incisors were edge to edge, it was more convenient for a child to lever the lower jaw forward. With very old persons, who had no teeth at all, one always had difficulty in making dentures to restore a normal bite because, usually, they were used to biting well forward with the lower jaw.

Mr. FICKLING said that he had been expecting somebody more experienced than himself to ask Mr. Sowden Hills what happened to those cases when the children grew up, if they were untreated. He thought that the study of orthodontics was very interesting, but it was only complete when the patient had reached adult age. It appeared that Mr. Sowden Hills found, in a Croydon school, 35 out of 140 cases showing this condition. Among adults, prenormal occlusion was definitely rare and certainly it did not come to anything like that percentage. Therefore, he thought it would be very interesting to follow up some of these cases which had had no treatment at all. If the patient took up a fresh occlusion which, at the time, was most comfortable, a number of these cases must, it appeared, correct themselves. He would like to ask Mr. Sowden Hills if he could say in what proportion of the cases he had seen, prenormal occlusion occurred.

Mr. LILLEY said that following on the last speaker's remarks he would like to mention that he had actually seen that happen. He did not have the records of the case because he had now left the Authority where he saw it occur, but he had noticed one or two cases where there was this apparent prenormal occlusion, and, two or three years later, without treatment, the occlusion had been normal, following, apparently, on the eruption of the permanent teeth. His recollection of the slides they had just seen made him think that the cases seemed to stop short; there were no slides showing the late results. He felt sure that as the last speaker had suggested, a lot of the trouble did correct itself with increasing age.

Mr. DOWNING said that with regard to his former remarks, amongst the young adults seen, averaging definitely more than 50 a week between the ages of 14 and 20, it was exceedingly rare to see a case of that kind. He had seen very very few and yet, as he said, there were at least 200 a year who had their teeth extracted.

Mr. R. CUTLER said that Mr. Sowden Hills, like all those who undertook any form of hospital or institutional work, was particularly

fortunate in seeing the endpoints of disease. But when one left the endpoints of disease and tried to work back to the original causes, those who saw the endpoints of disease only, might sometimes have difficulty in getting back to the first few links of the chain. The most interesting point, he thought, of Mr. Sowden Hills' paper was towards the end, when he quite clearly, in his own mind, differentiated between cases of true inferior protrusion and cases of pseudo prenormal occlusion which arose artificially and had no relation whatever to true inferior protrusion. His acid test, he had told them, was that a true inferior protrusion of the lower jaw could not be retruded at all. That, of course, was one test, but there were various other points of differential diagnosis which were equally certain. One was family history, and one was the open angle of the jaw—a sort of " Jack Hulbert effect "—and another was radiographic evidence of the relation between the first and unerupted second molar which Mrs. Lindsay drew attention to some years ago. All were very important points of differential diagnosis and of tremendous value when one was called upon to give a prognosis in any case where the lower teeth bit in front of the upper ones. It was quite clear that all the cases to which Mr. Sowden Hills referred were variations of Class I—which, in one classification were described as Class I, division 3—cases in which the bulk of the jaws was more or less equal, but it so happened that the upper jaw was a little shortened. If that occurred, it was quite clear that any slight accidental interference—such as the removal of temporary teeth—would allow the lower incisors to slip over in front of the upper incisors, and you would then get that condition which might develop in an exaggerated form as Mr. Sowden Hills had shown. Fortunately, they were all very easy to treat, and, as two or three speakers had remarked, there was not the slightest doubt that a certain number of these cases did cure themselves spontaneously, and there was every reason why they should, because they were cases in which the jaw balance was intrinsically normal in the first instance. He thought the evidence of two of their speakers that night—that one did not see in children of 14 or so, or in adults, that tremendous proportion of established inferior protrusion cases—forced one to the conclusion that spontaneous resolution occurred in many cases, and it would be natural to expect that if one realised that the cases, intrinsically, were all Class I type. Various local factors did produce the established condition, but they were only local factors which happened to act and become operative on Class I cases in which the upper jaw was slightly short from front to back in relation to the lower one.

The Chairman intimated that according to the rules of the Society, if the members wished for further discussion, after 10 o'clock, a proposal to that effect should be made and seconded. No one putting forward such a motion, the Chairman thereupon asked Mr. Sowden Hills to reply.

Mr. Sowden Hills in reply said that Mr. Rix had been very kind in his opening of the discussion on the paper and had let him down very gently. He could not really give the number of prenormal cases —the one school he had mentioned was an exception. It was most unfortunate that as much of his time was devoted to work other than education sessions he could not go out more often to dental inspections of infants. It did appear, speaking very roughly, that in inspecting infants' departments he found about ten out of 140 or 150 examined, showing this prenormal condition. In the case of the particular school he had mentioned, where he had found 35 cases, there was one case where all the teeth were present. That, he felt, half answered another speaker's question. With regard to the conditions causing the trouble,

it was true that it did occur largely amongst the poorer classes. He, himself, had in only one case produced a prenormal occlusion as the result of removal of all the deciduous molar teeth. Referring to the horizontal plane and horizontal movement of the mandible, he had noticed that with certain children, they would very readily protrude their mandibles. On the subject of serial models, he had already started upon that, and it would certainly be a very interesting study. In the one case where he had produced a prenormal occlusion, he was keeping all the models and following the case up. Someone had put the question of following cases up into adult conditions, but as he had had two years only in which to make his studies of the subject, the cases upon which he worked were scarcely adult, yet. With reference to the edge to edge bite, he could quite appreciate the point ; in fact, he could visualise a case, at the moment, where he thought he had got a prenormal occlusion because the patient was moving her mandible forward, but the mother—very opportunely—brought the father along with her on one occasion, and I saw at once that the family history was responsible. The father was a fine big policeman with a Jack Hulbert profile, and the child was following after the father, so that the case had nothing at all to do with an acquired condition. As regards space retainers, he thought he had already heard Miss Wolsax speak on that subject, he recollected her mention of the rings and metal strips. It would, of course, be ideal, but the method required a tooth to be present in order to fit the device on. In cases of multiple extractions, for instance, the system would not do at all. He noticed that one or two speakers had remarked upon the fact that the adult condition was not seen in anything like the numbers he had given in the early stages, and that most cases resolved on their own. It was quite possible, of course, that cases could resolve before any serious complication with the permanent incisors had occurred. But in the slides which he had shown them, he could not possibly imagine those particular cases ever resolving themselves. Those were the cases they had to treat. Actually, in all the cases he had had in the past eighteen months, he had not yet seen a case resolving itself. He quite appreciated that if you removed the deciduous canines you could get it, but you would have a closed occlusion—through the absence of the deciduous molars—to deal with then or later on. He was extremely reluctant not to agree with Mrs. Lindsay wholeheartedly, but he had the opportunity of seeing a large number of young children and he had never seen a child produce that prenormal movement where they had inspected a case with toothache. Those cases which were prenormal through extractions he had not himself performed, he could not, of course, answer for. Again, the only adults he saw were maternity and child welfare cases, and even then, he did not see many for extractions, as a good many cases came to him from another centre, where the extractions had been performed, and he had to fit the dentures. In answer to Mr. Cutler, he would agree that he had taken family history into consideration, and some of the other factors as well. He did not wish to disagree too much, but, so far as he could remember, in those cases which he had had an opportunity of seeing before extractions were made, there did not seem to be anything abnormal in the antero-posterior relationship. He hoped that he had been able to answer everyone adequately.

The Chairman said that if a vigorous discussion were any criterion of the success of a paper and of the work that had been put into it, then Mr. Sowden Hills must be feeling very well repaid that night. He would ask the company, in the usual way, to show their appreciation of the paper and of all those who had taken part in the discussion.

The Chairman intimated that the next meeting would be a special

occasion. They were fortunate in obtaining the consent of Dr. de Coster to come over and give a special lecture demonstration on "The Distal Movement of the Molar Teeth as one of the First Steps in Treatment, in conjunction with the Practical Technique of a New Automatic Mechanical System." He was sure that it would prove most interesting, and he hoped the members would make a very big effort to bring as many friends as they possibly could to the meeting and make it a great success and worth Dr. de Coster's while coming over. He would remind them that that meeting was due to start at 7.30 p.m., and not, as was usual, at 8 p.m.

The Distal Movement of the Molar Teeth as one of the First Steps in Treatment. In conjunction with the Practical Technique of a new Automatic Mechanical System.*

By Dr. Lucian de Coster.

WHEN your distinguished Programme Secretary, Mr. Wilson Charles, asked me to give a paper of practical interest at one of your meetings, I felt so honoured that I accepted immediately. I then felt a little troubled because I could not find a subject sufficiently up to date to bring before a Society such as yours, but after much reflection I decided to speak about a subject that I had worked out and had continually studied for several years past. On some previous occasions I had given some demonstrations about a new sort of orthodontic force, but up to to-day I had not been able to present it in a manner to merit the attention of your Society. If my paper and demonstration to-night help any member of my audience in the treatment of even one single case, I shall feel that my efforts have not been in vain.

The daily use of facial teleradiographs led to the conclusion that in a large number of malocclusions the first permanent molar has undergone an exaggerated mesial movement relative to its normal position for any given age. The anterior teeth, of course, will then have to accommodate themselves to the new position, so that crowding of the front teeth, axial deviations and shortening of the apical base can in many cases be regarded as a result of this abnormal position of the first permanent molar. When we made it a matter of daily routine to have radiographs of the wrist in order to keep an eye on the rate of skeletal growth and to compare that with the development of the dental arches, we became able to explain to a certain extent the abnormal forward movement of the molar teeth. Our conclusion was that the actual cause of that shifting lies in a lack of synchronism between bone maturity and dental differentiation. Frontal crowding, axial inclination, reduction of apical base, infantilism of the maxillary bones are only symptoms of that condition. (Figs. 1, 2, 3, 4, 5, 6, 7.)

* Read before the Society, March 6th, 1939.

Fig. 1

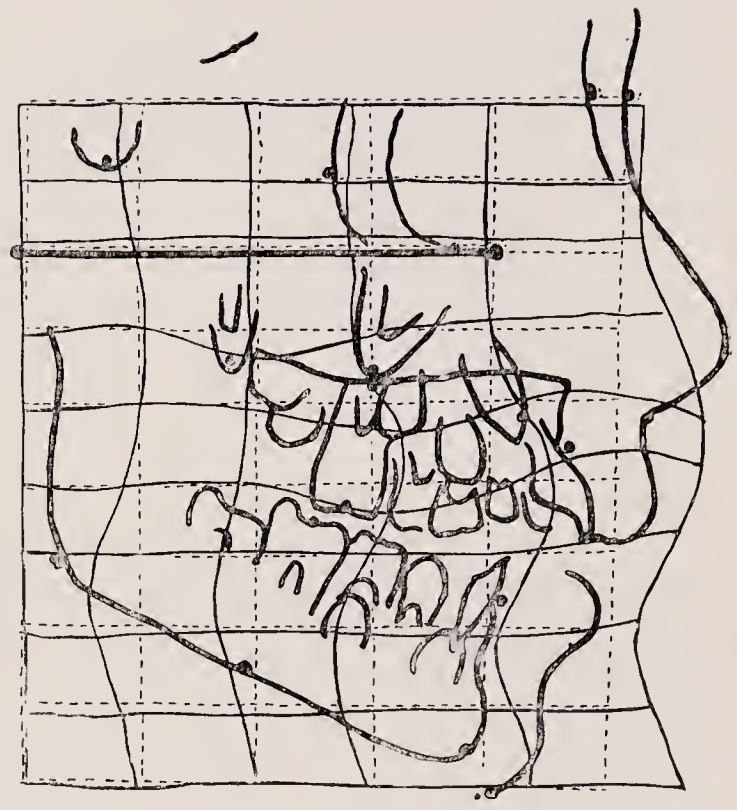


Fig. 2

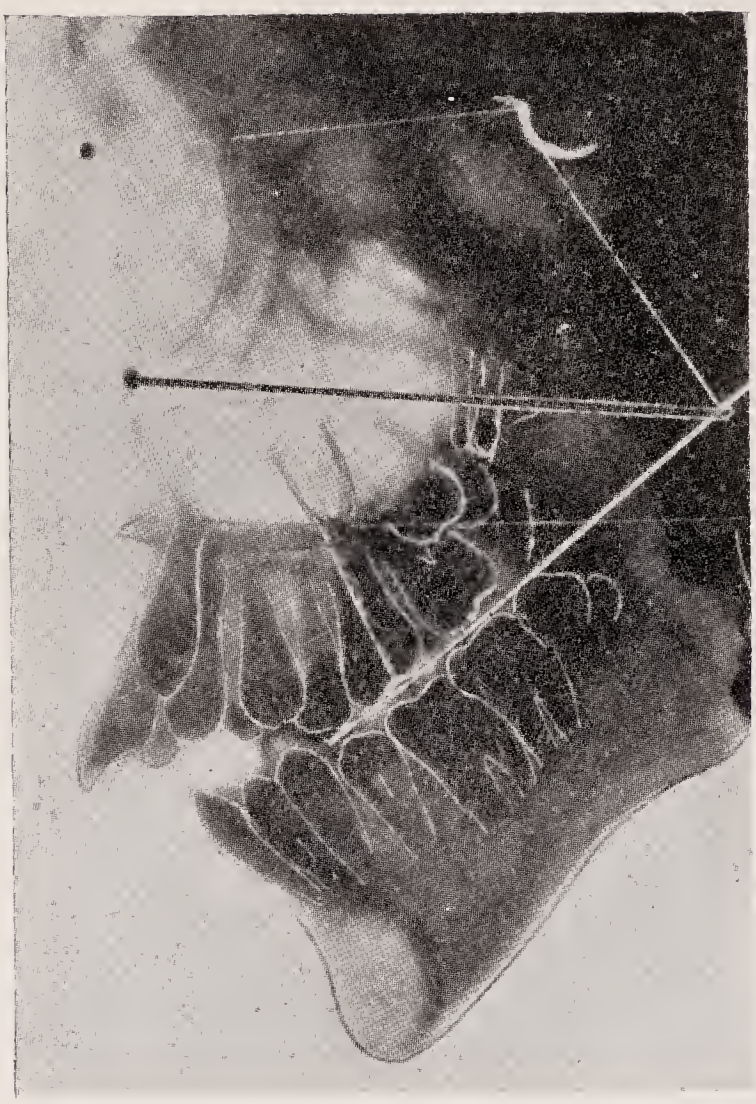


Fig. 3

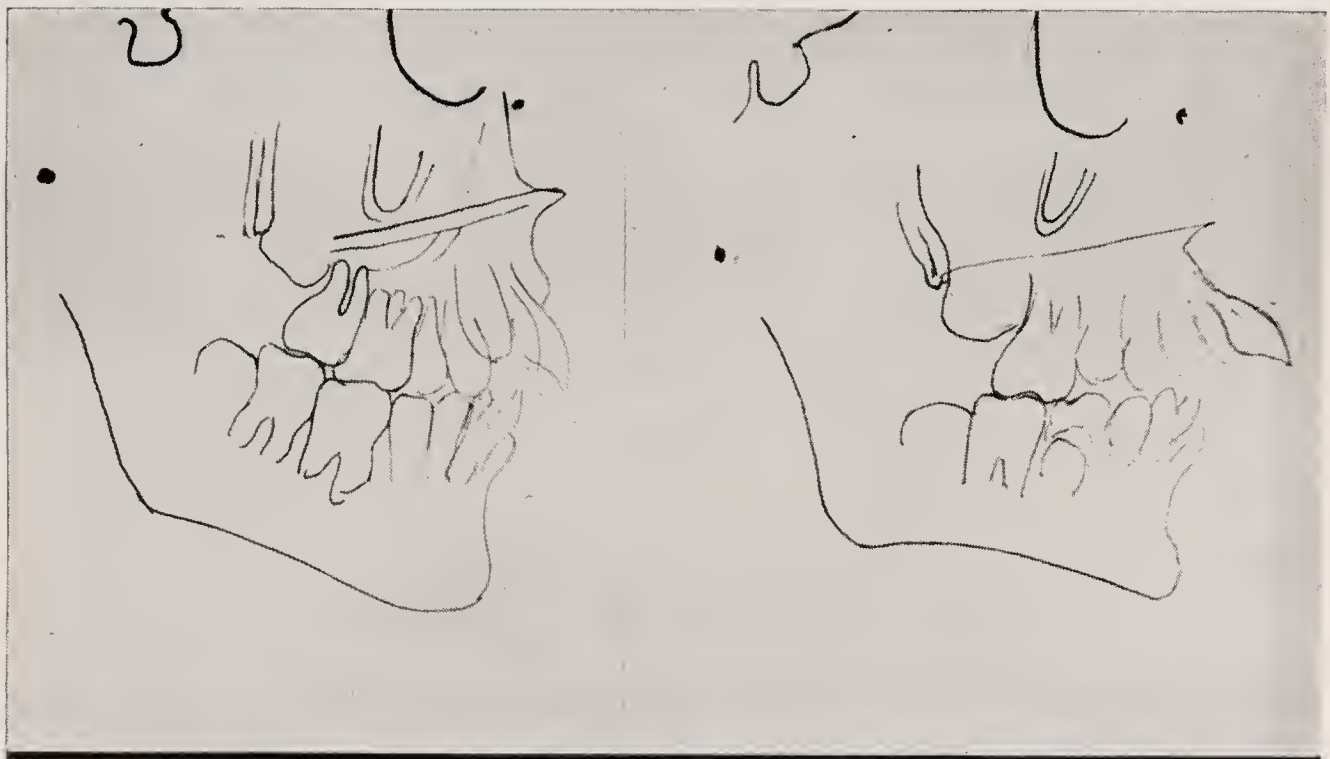
Fig. 1. A normal individual of 17 years. Proper relations of the anatomical points of the face.

Fig. 2. A tele-radiograph of a boy with protrusion. The mesh—network of lines—shows the progression of the forward march of the first molar. This is a case of severe upper protrusion and the position of the first molar can be noted according to the position of the deciduous molars.

Fig. 3. A tele-radiograph of a case of a girl, where the chronological age is 12 years ; the bone age 8 years, and the dental age 13.5 years. The bone of the face is in an undeveloped condition, while the teeth are too crowded in position. The development of the teeth is too advanced for the geneological maturity of the girl. The forward position shows the infantilism of the maxillary bones and the infantilism of the occlusion plane, or differentiation of the occlusion plane.

Fig. 4

Fig. 5



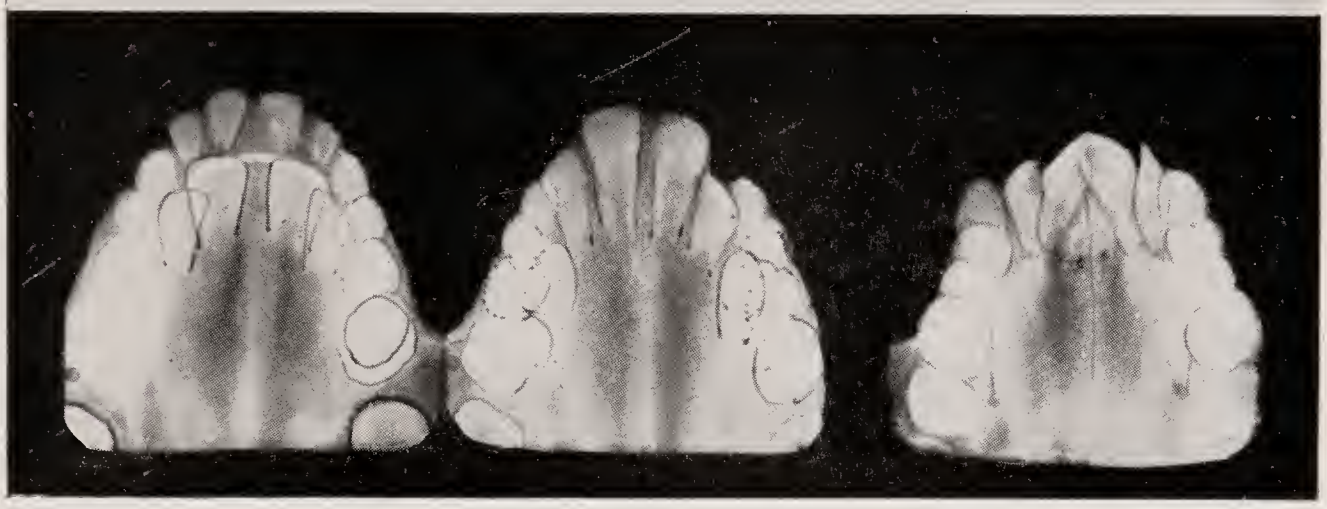


Fig. 6

Fig. 7

Figs. 4, 5, 6. The normal movement can also be detected by the relative position of the key ridge to the first molar, either on sagittal tele-radiographs or on occlusal radiographs. Fig. 8, from Sir A. Keith, shows clearly the mesial movement of the first molar.

Figs. 4 and 5 show the sagittal radiographs of two children, 11 years of age, where the first molar has already progressed beyond the farthest position of adult age.

Fig. 6 shows occlusal radiographs of two children having sucking habits. The first molar has moved mesially. Note the gap between the first and second permanent molars.

Fig. 7 shows the same condition and a very crowded position of the front teeth.

Although the explanation is rather new, the facts themselves were known and described by a lot of orthodontists—Sir Frank Colyer, Sim Wallace, Grieve, etc.—at a time when the stability of the first molar was considered not only as a working hypothesis but as an axiom. Edward Angle himself seems to have been of the same opinion when he devised the edgewise arch specially constructed for distal movement of all the teeth. Several years ago I produced conclusive evidence of that exaggerated mesial movement.

For myself I believe that the exaggeration of that normal movement is due in a large number of cases to a premature evolution of the dental elements—stimulation of epithelial growth—or to a tardy growth of bone structures. The initial cause is thus of

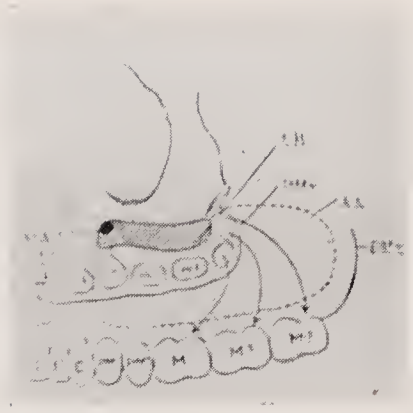


Fig. 8

Fig. 9

Fig. 9. Radiogram of a young woman treated by the usual methods, by mere expansion and forward movement of the lower arch. The occlusion is fairly normal but there is not a normal relation between the dental system and the skeletal base.

general origin, namely lack of synchronism, while the direct cause of the malocclusion is of local origin. If this happens with a young child, where we can hope for a further development of the skeleton, it will be sufficient to correct that mesial movement of the molars while the face goes on growing forward (Fig. 8). The front teeth, by the unhampered continuation of bone growth, will then be able to regain their proper places. When the patient has reached a mature age extraction will be indicated, but only after the face has acquired its full development. These theoretical conclusions seem to me to indicate, from a therapeutic standpoint, the need of a distal force in order to withstand the abnormal tendency to which I have referred. Of course, expansion will be needed in many cases, but it cannot be considered any longer as the first and principal step in arch development, for if the first molar is too far forward in position expansion alone will not be able to restore mechanical and functional balance without distal movement (Fig. 9). Moreover, if the molar is mesial, the intermolar width will necessarily be reduced and counterfeit an arch narrowness. The diagnosis is not an easy matter because the position of the first molar is variable, according to the age or functional development, and also according to the development of the dental system. Graphs show it clearly, but we can also gain a certain idea by radiograms of the face or occlusal radiograms if we compare the position of the molar with the processus zygomaticus against a standard norm.

These theoretical ideas had to be explained before we could study the new sort of appliances I am introducing, because they form the basic principles justifying their use. The main idea can be assumed as follows : Malocclusion is the product of normal growth processes acting under abnormal conditions. *In most cases there is not so*

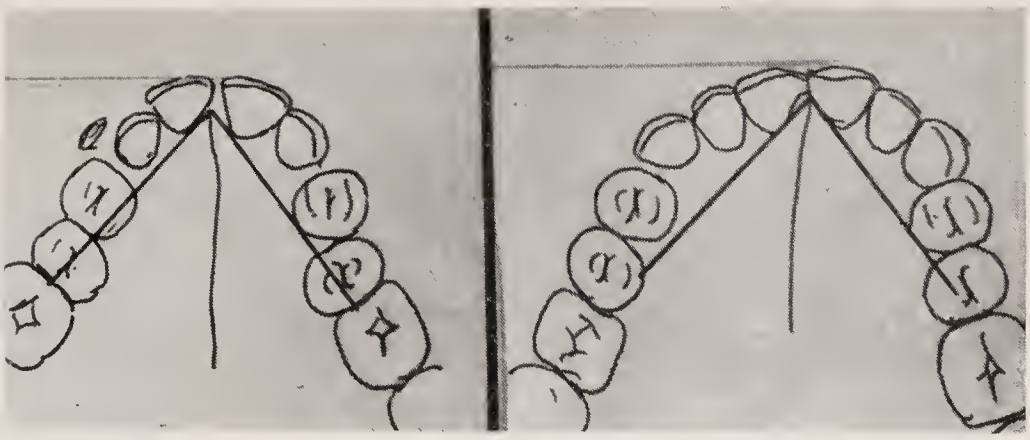


Fig. 10

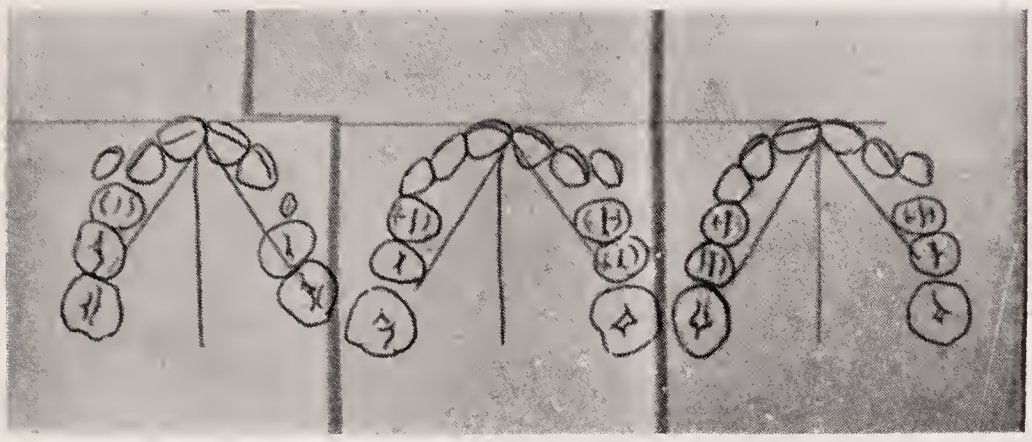


Fig. 11

Figs. 10 and 11. Stereographic drawings of two cases showing the distal movement of the molars after treatment and during treatment.

much lack of growth as deviation of growth. One of the first symptoms of that deviation is an exaggeration of mesial movement. That mesial movement opens up a large number of possibilities according to all sorts of conditions.

Distal movement will not only lengthen the arch for premolars, canines and incisors, but will increase the intermolar width (Figs. 10, 11). One can ask whether the molar will really go backward, and, if so, whether it would not interfere with the development of the following molars. Actually it is not very easy to ascertain whether the molar is actually going backward or whether it is only arrested in its forward shifting whilst the facial bones are growing forward, because the treatment extends over a long period, but undoubtedly the finished cases show a considerable lengthening of the arch. I think that if it is true that our force can stimulate the growth of bone, that stimulation will be more active on the tuberosities than on any other part, because, after all, the tuberosities form the growing part of the jaw.

For several years I have used a simple lingual arch directly soldered to bands, particularly in mixed dentures and deciduous arches, for I observed that in most of the cases there occurred a distal movement of the molars. That distal movement was not combined with a frontal movement of the front teeth, for in the majority of cases the lingual arch was not in any way acting upon the front teeth (Figs. 12, 13, 14).

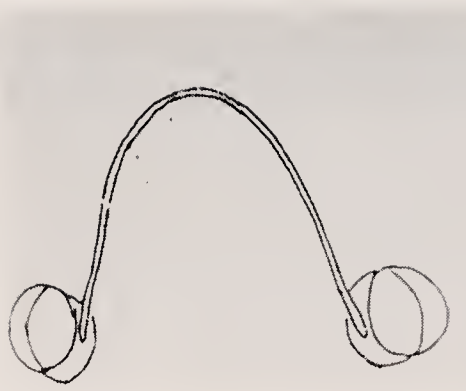


Fig. 12

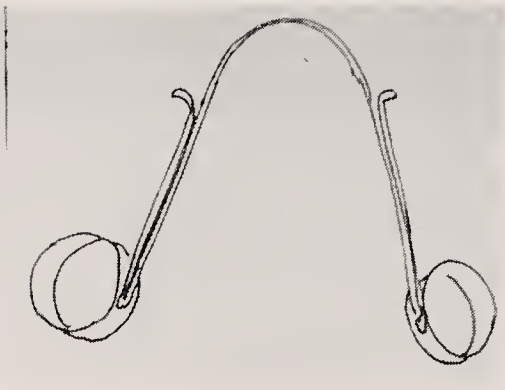


Fig. 13

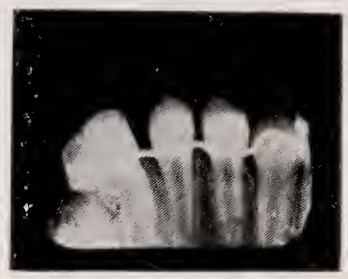


Fig . 14

Figs. 12 and 13. Very simple lingual arches.
Fig. 14. Radiogram showing the distal movements.

Fig. 15

Fig. 15. Photographs of a case before and during treatment, the lingual arch being in position.

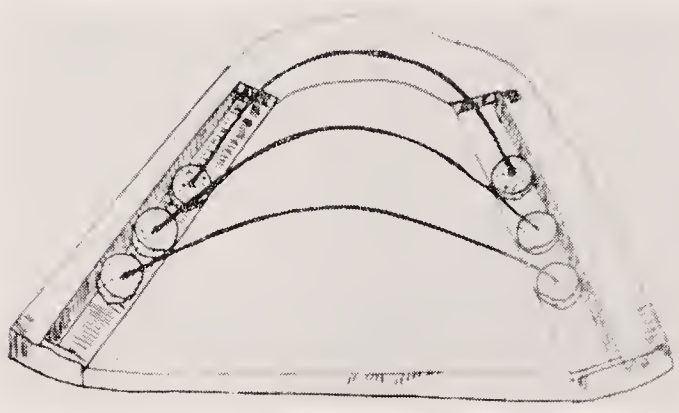


Fig. 16

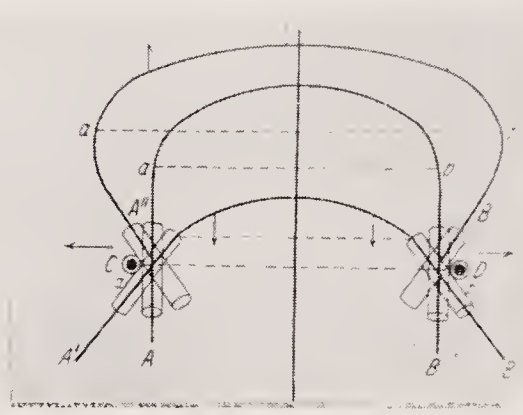


Fig. 17

Fig. 16. Schematic drawing of what is supposed to occur. The tooth is assimilated to rounded blocks gliding in a groove. The transversal force of the spring is transformed into a sagittal one.

Fig. 17. Practical experiment. The spring running between two fixed points, glides in mobile tubes. The drawing shows the conditions governing the various movements.

In cases where the arch was fixed by a spur upon the premolars, not only the molars but also the premolars were found to go back. The study of finished cases showed actually a distal movement, whilst the front teeth came down in proper alignment (Fig. 15). That movement was rather surprising when the experimental study of the action of the lingual arch fixed at both ends could not show a distal movement of the ends themselves. After a large number of experiments we observed that when an arch is fixed at both ends to a body gliding in a groove, the expansion force was transformed into an antero-posterior movement. This experiment is rather accurately comparable to an arch fixed to the molars as anchor teeth. We can assume that the teeth are gliding in a groove between the external alveolar wall and the internal alveolar wall, the interdental septa being very thin (Fig. 16). We can see the best demonstration of that gliding movement after extraction.

Another experiment can be made in order to clarify these points. When we slide an expansion spring through two tubes, fixed at one point but rotating around that point, we observe that the movement of the spring arms will differ according to the direction of the tubes (Fig. 17). We note that when the direction of the tube is parallel to the mid-line or to a line perpendicular to a line joining the two rotating points there is no sagittal movement at all. When the tubes are making an angle towards the mid-line, the spring slides backwards. If the angle is open towards the front, the movement of the spring will be forward. These movements can be reduced to a mathematical formula. Given an expansion spring O.X.D. with an expansive power of F gliding between the points A and A, the resultant distal force f can be formulated $f = F \sin \alpha$ (Fig. 18).

f the distal force
F expansion force
AC tangent to the arch
AB line parallel to the symmetry axis
α angle between AC and AB

The resistance of friction is not taken into account, and it is supposed that the extremities glide in a direction parallel to the mid-line.

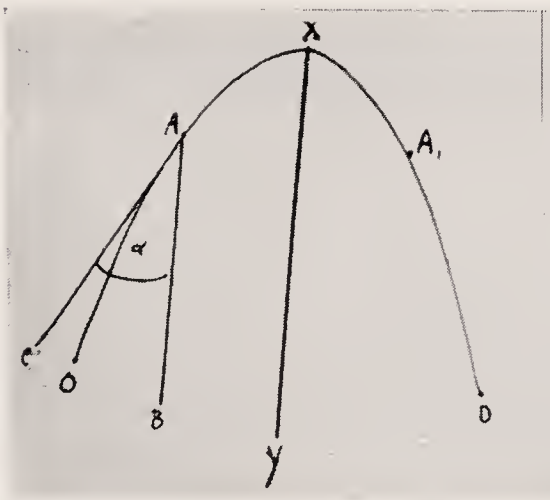


Fig. 18

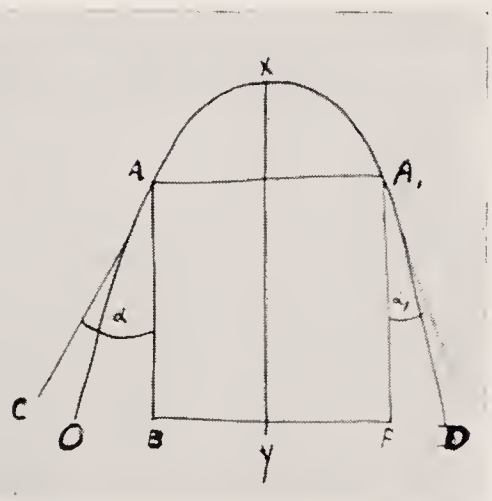


Fig. 19

Figs. 18 and 19. Geometrical pictures for the mathematical explanation of the movement.

If the movements occur in the direction of the arch, the formula will be altered as follows :—

$$f = Fx \frac{\sin \alpha}{\cos \alpha} \text{ or } Fx \operatorname{tg} \alpha$$

With small angles tg α is nearly equal to sin α , and we are allowed to use the first formula : $f = F \sin \alpha$

We can present this mathematical formula in a more understandable way, but perhaps not so precisely. For an arch C.X.D. with a fixed point in A1 and A, we have $f = F \sin \alpha$ and $f, = F \sin \alpha$, but as we do not know the expansion force for each half of the arch, we can say :

$$f = \frac{F}{2} \sin \alpha \qquad f, = \frac{F}{2} \sin \alpha \quad \text{(Fig. 19).}$$

sin α will be proportionate to OC and FD
As OC+BC=OD – CB
f+F, –
or f f, –
We may state : the force f and f, is proportionate to OB and FD
As OB+FD=DD–BF, ff, force will be proportionate to the difference between BF and OD or between AA and OD.
If in our arch AA, is equal to OD the force f is equal to O.
If per contra AA > OD the force f will be negative.

In order to transpose into practical use these mathematical and experimental principles you must have (*a*) a rigid frame, providing the possibility of giving the needed direction to the tube, and (*b*) an elastic wire. As we have seen, we can change the direction of the resultant movement by changing the direction of the tubes, but we can obtain the same effect by changing the action of the spring. The resultant force of a contraction spring will be contrary to the force of an expansion spring.

The Rigid Framework.

The rigid framework has to carry the guiding tubes, the principal aim of which is the transformation of a transverse force into a sagittal one. On the other hand, that framework will also help as a fulcrum for the forces of the springs and check the reaction of these forces. Unnecessary forces will no longer be supported by the teeth and produce quite unexpected results. This rigid framework can be removable, in the form of a plate, or fixed as an arch. On the rigid skeleton will be fixed an open tube positioned in the form of a grooved arch. Other short U tubes will be pinched over the first tubes in order to close them at given points. When a removable appliance is used that tube can be fixed on the plate, or soldered to the metal plate or fixed to the lingual bar as convenience dictates (Fig. 20). For the fixed appliances the tube itself will constitute the main part of the appliance. As with a removable plate, the reaction of the springs is supported by the numerous contacts with the teeth, the gums and the palate, whilst with a fixed appliance we shall have to proceed as follows : (*a*) by adapting the grooved arch closely to the teeth ; (*b*) by giving to the end of the arch a slight upward bend. It must be noted that as the arch constitutes

a long lever arm, the slightest resistance will be sufficient to cut out the reaction. The open tube is constructed out of a plate of 0.25mm. thickness stamped in a U form. The tube is little more than 1mm. in all dimensions. The little auxiliary U's adapt themselves exactly over these tubes. Later a more massive grooved arch will be constructed, as being convenient either for a removable lingual bar or in conjunction with a fixed appliance.

The Gliding Spring.

The gliding spring can be of various dimensions. It is best to have it of the hardest wire. It can be formed to an expansion spring or a contraction spring. The spring is not fixed at all and glides freely through the tubes. Its action will depend, as has been shown already, on its form, on its expansion or contraction function, and on the nature of the point of resistance.

What therapeutic possibilities does the new kind of mechanical force allow ?

(1) Distal movement : (*a*) for pushing the molars back,
(*b*) for pushing the premolars back,
(*c*) for pushing the incisors back,
(*d*) for acting as a rotating force.

(2) Mesial movement : for mesial movement of incisors,
for mesial movement of premolars and molars.

(3) Vertical movements.

(4) Expansion is only a particular form of excentric force or so-called " mesial " movement.

(5) The rigid frame permits : (*a*) the use of all kinds of auxiliary springs.
(*b*) the use of all sorts of auxiliary assemblies, such as screws and inclined planes, etc.

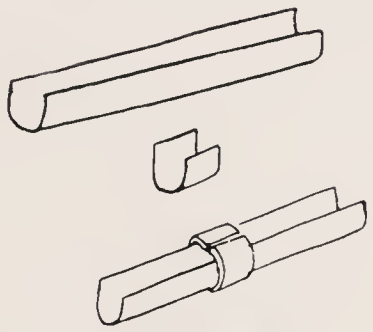


Fig. 20

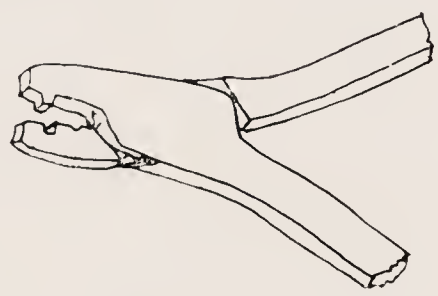


Fig. 21

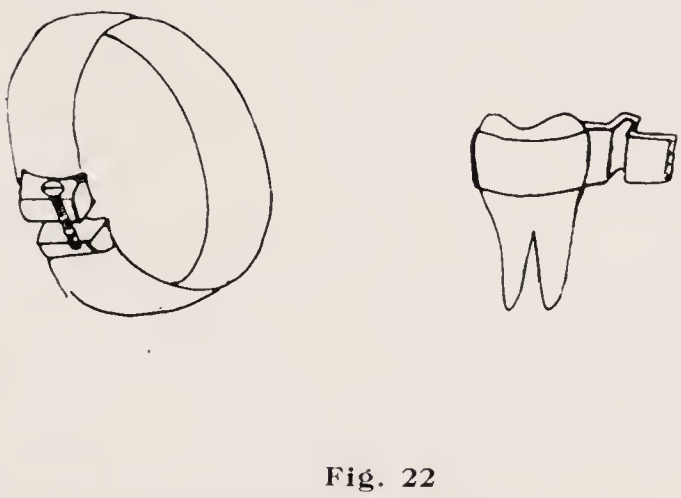


Fig. 22

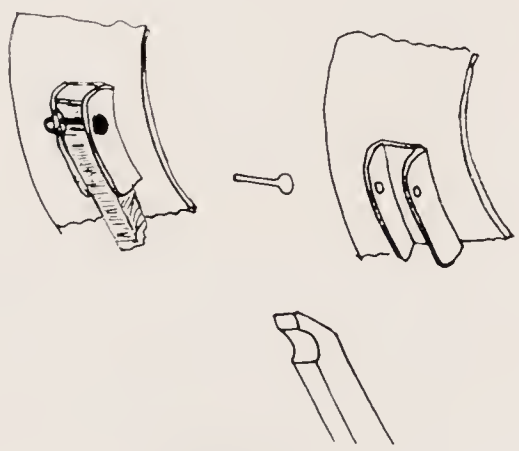


Fig. 23

Figs. 20, 21, 22 and 23. Bands, tubes, lock and band-forming pliers.

Technique.

At a glance the first need will be a convenient anchorage and anchor band for the fixed as well as the removable appliances. For the fixed appliances the question of fixation of the grooved arch to the anchor band must be studied, and as it will be advisable to use anchor bands also for removable appliances in order to have an exact fitting and good stability, we will at first describe the construction of the anchor band. It seems mathematically impossible to have a soldered band fitting accurately at the gingival border as well as at the occlusal border. If we adapt perfectly a metal tape around the coronal surfaces of a tooth and solder the ends *in situ*, it is impossible to remove the band without stretching the lower border. If we remove the band after having it adapted to the tooth and soldei it, it is impossible to push it into place without stretching the lower border. If we want an exactly fitting band that cannot become loose, we must (*a*) adapt perfectly our metal tape to the coronal surfaces of the tooth ; (*b*) find a way of opening the closely fitting band in order to permit it to glide over the greatest convexity of the tooth surface and then of closing it afterwards.

The first need is a convenient forceps permitting a close adapting of the metal band. Several months ago I found amongst a lot of old instruments a forceps which could be very useful for our purpose with only slight modification. One of the beaks has a large ridge directed transversally and, 4mm. back, a little groove in the same direction. On the other beak there is a groove receiving the ridge. The nose of the forceps is rounded out to adapt to the surface of the tooth (Fig. 21).

At first the metal tape is taken round the tooth and adapted by the usual case plier. The band is then removed, the ends shortened, welded together and slightly folded so as to make a little pad, and the little pad is then engaged in the little groove (Fig. 22). The band is replaced by the band forming pliers, and the pliers tightened. The metal flows smoothly round the tooth surfaces after which the band is removed, the ends cut off and a little lock is soldered at each end. When replaced a turn of the screw will refix the band in its previous position and make it impossible to be loosened. It would, perhaps, save time to mould the band on a metal model before adapting it to the patient's tooth.

If we use removable appliances it would be good practice to have a piece of wire soldered on the lingual side of the band engaging in the groove of the U tube, and on the vestibular side a little groove cut into the screwbody, engaging the clasp.

For fixed appliances the matter must be considered more closely. In a large number of cases where there is no need of movement for the molar anchor tooth, the grooved arch can be soldered directly to the band. If any modifications are to be made to the appliance, it would be easier to remove the band than to remove a lock. If the anchor band has to be removable a lock will be necessary (Fig. 23). Such a lock is rather difficult to devise if we consider the need for firmness, simplicity, cheapness and giving the tooth the maximum amount of liberty.

Fig. 24. The impact point of the spring upon the molar.
Fig. 24a. The distal movement.
Fig. 24b. The spring acting on the molar when used with plates.

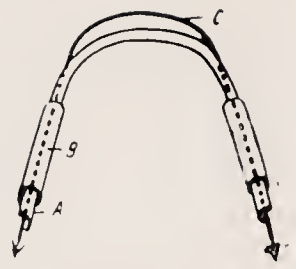


Fig. 24a

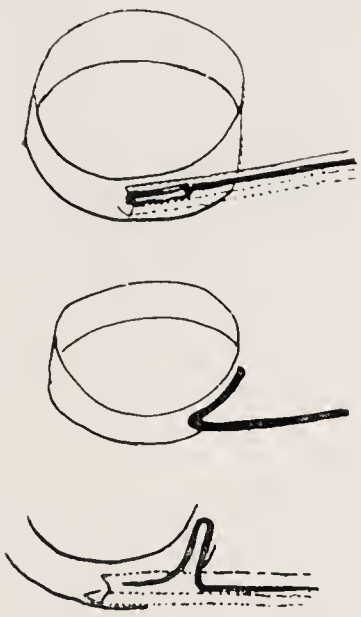


Fig. 24

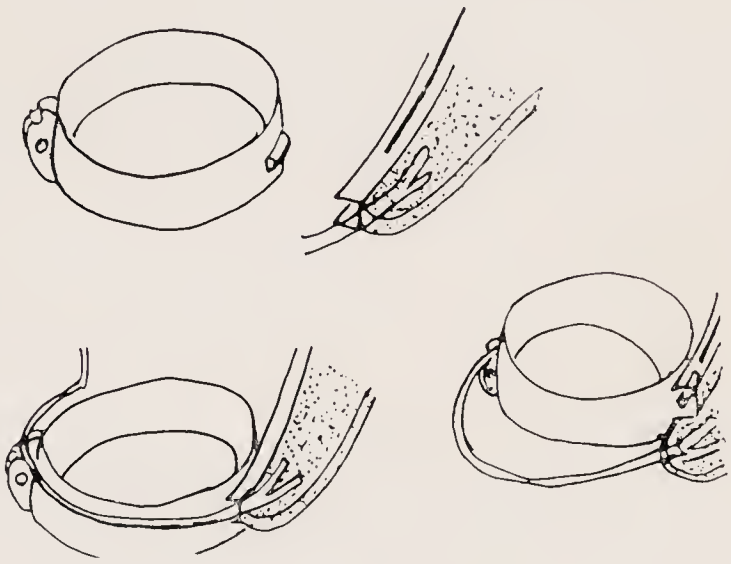


Fig. 24b

Distal Movement.

Distal movement is most frequently required in order to correct or check exaggerated mesial movement of the whole dental arch. Distal movement needs divergent tubes and an expansion spring. The same spring can be used for molars and premolars, but we should have to apply the power to a different spot.

Distal Movement of Molars.

(1) Grooved arch with an auxiliary U tube at the level of the second premolar. The movement so given does not exceed 2mm. The extremity of the spring points directly on the band of the molar in the mesial part of its lingual side (Figs. 24, 24a). It is good practice to have the spring kept in by a wire or a button on the band. We can also grasp the molar by a spur on its mesial face. This arrangement can easily be applied to a plate (Fig. 24b), and for fixed appliances we ought to use a liberty lock. The molar will be driven backward either by coronal tipping or by rotating around its long axis, or, better, around its lingual root, at least for the upper first molar. If the free end of the spring is rather long there may be an expansion movement which can easily be checked if so desired, as the little U tube or brace has only to be slipped along nearer to the molar.

Form of the Spring.

Usually the spring has the same form as the tube, on a larger scale so as to have expansion (Fig. 25). I believe it best to have a parallel expansion of the whole arm so that the friction and reaction and also the force remains permanently the same. We can also activate the expansion force by forming a loop at the front part at the level of the canines. The position of the brace tubes has also a certain

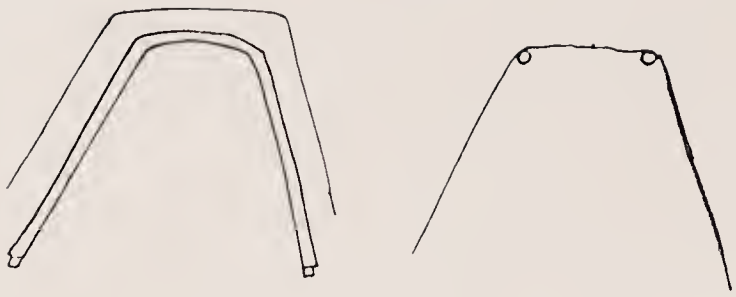


Fig. 25

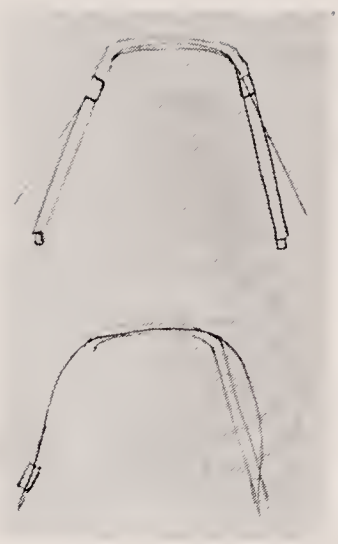


Fig. 26

Fig. 25. General form of a distal spring.
Fig. 26. The importance of the position of the U brace.

importance, for if the brace post is placed too high we shall have too much expansion at the end of the spring (Fig. 26). On the contrary, if the post is placed too far backward there will be an expansion force in the lateral part of the spring which will interfere with proper distal movement. It is therefore best to take the brace post at the middle level or to make two parts of it.

(2) As the spring is acting backward, the rigid tube has to support a contrary reaction forward. That forward reaction is very light and is not of much importance clinically as the tube is too heavy and the least resistance sufficient to prevent it. If we want to get rid of that reaction we can do so by fixing a coil at the end of the spring, the coil resting upon the molar and pushing it backward. The reaction of the coil is supported by the distal spring and cannot produce any appreciable effect (Fig. 27).

(3) If it is possible to have an anchorage upon the premolars we shall use a tube soldered to the band on the premolar. The grooved arch and the spring pass through the tube, and the spring rests upon the molar (Fig. 28).

(4) In cases where an incline or bite plane is indicated, we can easily push back both molars and premolars by a recurved spring hooking in front of the premolars (Fig. 29).

(5) In the same cases we can use another method. The continuous clasps enclosing molar and premolars are gliding in the distal part of the tube—closed at that level—and the spring impinges upon the clasps and pushes both molar and premolars back (Fig. 30).

Distal Movement of Premolars.

(1) The usual spring receives a bend at the level of the premolar. The spur is impinging on the mesial side of the tooth.

(2) A simple hook can be soldered to the spring (Fig. 31).

(3) A loop on the spring can be ligatured to the premolar and carry them back.

(4) Bands on the premolars with brackets engaging the spring.

(5) The terminal part of the spring is recurved and returns up to the level of the premolar. The recurved part can also act as a finger spring.

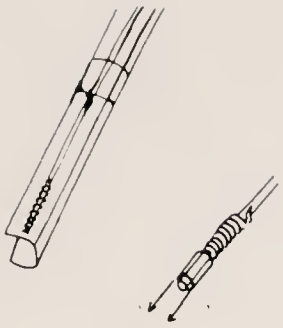


Fig. 27

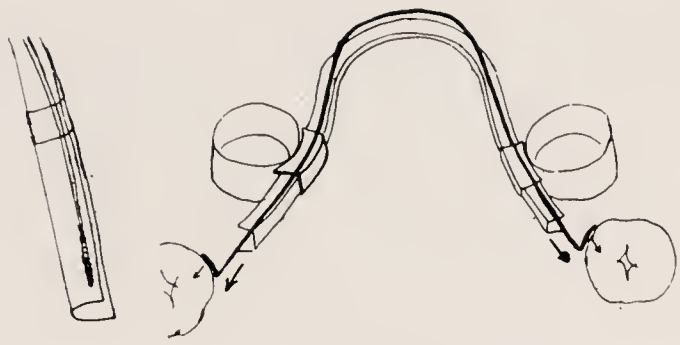


Fig. 28

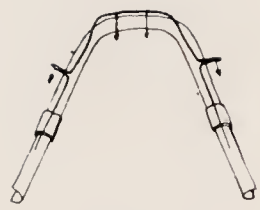


Fig. 29

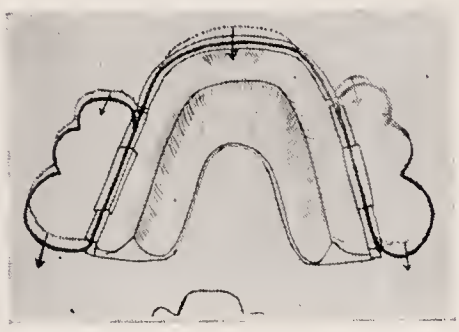


Fig. 30

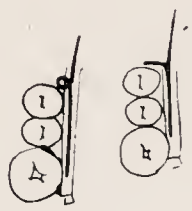


Fig. 31

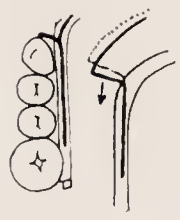


Fig. 32

Fig. 27. Coil spring at the extremity of the distal spring.
Fig. 28. Distal spring on the molar anchored on the premolars.
Fig. 29. Distal action on premolars.
Fig. 30. Plate with bite-plane. The clasps are mobile and move with the spring.
Fig. 31. Distal action on premolars.
Fig. 32. Distal action on canines.

Distal Movement of the Canines.

In a large percentage of cases the distal movement of canines needed will be only a coronal movement.

(1) Hooks on the distal spring can be engaged in front of the canines and bring them backward.

(2) Loops on the spring can be ligatured to the canines by means of bands and spurs.

(3) It will be shown afterwards that with the distal spring for incisors it is possible to produce a wedging action on the canines.

Distal Movement of Incisors.

The distal movement of the incisors can be effected in different ways (Fig. 32) :

(1) By a vestibular arch sliding through horizontal tubes on the molars. A lingual arch checks the transverse movement. A plate can very well be used in that instance. The anterior border of the plate will be ground off in order to leave space for the incisors as they are retracted (Fig. 33).

(2) By a linguo-vestibular spring passing from the lingual side of the arch to the vestibular side between the canines and lateral incisors (Fig. 34). This linguo-vestibular arch has different actions.

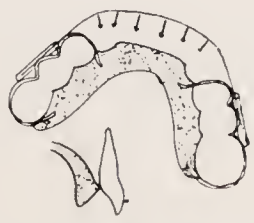


Fig. 33

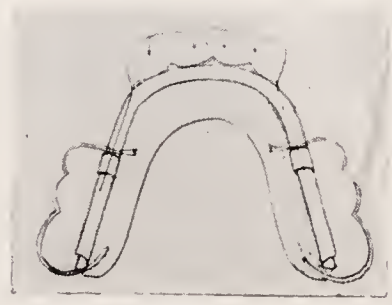


Fig. 34

Fig. 33. Distal action on the incisors.
Fig. 34. Distal action on the incisors.

As it is passing between canines and lateral incisors, there is a wedge action upon the crown of the canine which is pushed back. The action of distal movement also becomes apparent upon the incisors. The position and form of the linguo-vestibular spring will depend largely upon the form of the front part of the arch. It seems better to have a rather heavy spring, 0.6mm. in thickness, than a thinner one, for reason of stability. This spring has a really wonderful action without being the least painful, and acts slowly and automatically. Moreover, it is very easy to adapt it to a plate, and it cannot go beyond a certain limit. It is also easy to have it fixed in brackets where we desire a special action from one or another tooth.

If we want to leave the canines alone and also have a better fixation upon the incisors, the lingual part of the spring can be fastened together by a lingual wire passing behind the incisors, so that these teeth are caught between the lingual and the vestibular wire (Fig. 35). This disposition can also be very useful in order to change the long axis of the teeth, according to the respective position of the lingual and the vestibular wire. It has also the advantage of keeping the four front teeth in their respective positions (Fig. 35a).

(3) We can use a simple distal spring gliding in the open tube. In the front part the incisors are tied by wire ligatures to the distal spring. The teeth can be tied separately or all together (Fig. 36).

(4) Bands are placed upon the incisors with lingual hooks or brackets (Fig. 35b). The lingual distal spring is inserted into the brackets and will retract the incisors.

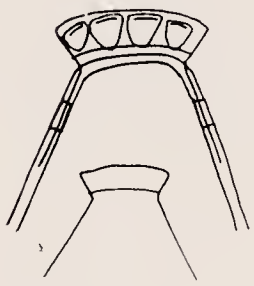


Fig. 35

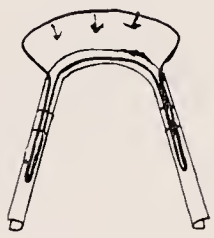


Fig. 35a

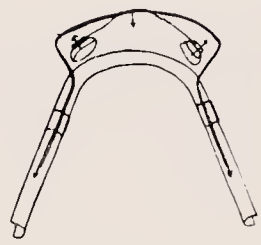


Fig. 35b

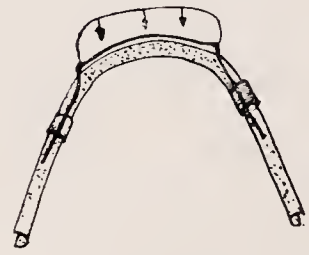


Fig. 36

Fig. 35. Distal action on the incisors.

Fig. 35a. Distal action on the incisors, reinforced movement.

Fig. 35b. Distal action on the incisors, combined with local movements of the laterals.

Fig. 36. Lingual distal spring acting on the incisors by wire ligatures.

Unilateral Action.

The distal action of a gliding spring can be rendered unilateral. We have only to deform the spring by giving on the side where no action is wanted a parallel direction to the spring wire.

Massive Action in Distal Direction of all the Teeth of the Arch.

(1) The possibility of throwing both molars and premolars back, specially with a plate provided with bite-planes, has already

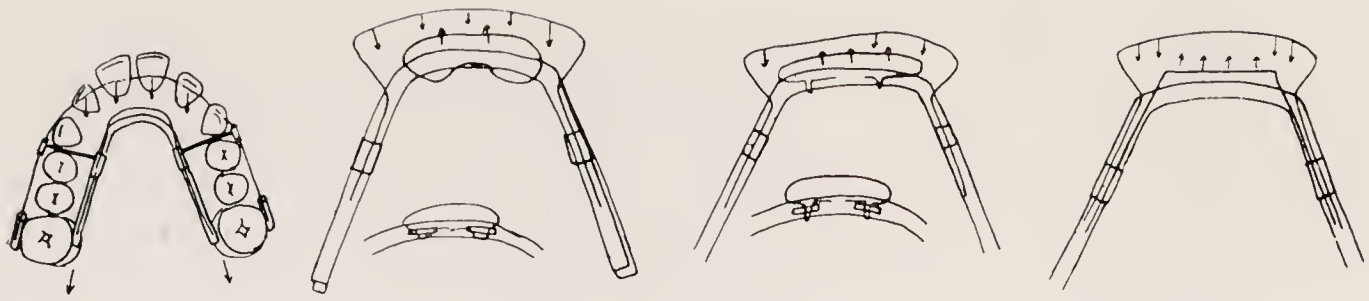


Fig. 37 Fig. 38 Fig. 39 Fig. 40

Fig. 37. Distal movement of molars and incisors.

Fig. 38. Distal movement used in conjunction with mesial force in order to obtain torsion. Distal spring combined with Schwarz spring.

Fig. 39. Distal spring combined with mesial contraction spring.

Fig. 40. Distal spring combined with mesial spring.

been referred to. If we fix on that plate a vestibular arch gliding in vestibular tubes we can move the whole arch backward at the same time (Fig. 37).

(2) There is also another possibility—a vestibular arch gliding through a tube at the height of the premolars, then going back around the molars and returning in a grooved arch. Of course, the reaction of such a mechanism would be very active, and it would be better to use it only with removable plates and bite-planes.

Torsion.

The distal force of a gliding spring can be useful for torsion. In simple cases it will be sufficient to have a distal force acting against a rigid resistance on the lingual side, but we can improve the torsion by fixing the linguo-vestibular spring upon the teeth which we have to rotate either by a McCoys' tube, a vertical tube or a horizontal tube. In some cases it may be necessary to use an active force as reaction—distal force combined with mesial force. Different possibilities are open :—

(1) A linguo-vestibular distal spring. As mesial force we can have (*a*) a simple mesial spring acting in contraction ; (*b*) a Schwarz spring, or (*c*) a simple auxiliary spring acting in contraction (Fig. 38).

(2) A linguo-vestibular spring with recurved ends acting as auxiliary spring.

(3) A linguo-vestibular spring having on the lingual part of that spring an expansion spring fixed by little tubes.

(4) A distal and mesial spring can act in the same tube and work in divergent ways (Fig. 39).

If a general distal movement is needed, the distal spring will be vestibular. In the cases where the torsion is localised on one tooth, it is better to have a lingual distal spring fixed to the tooth by ligatures or to a hook fixed on a band at the most eccentric border (Fig. 40).

Mesial Movements.

There is no more difficulty in producing mesial movements.

(1) A spring acting in expansion, gliding in a tube directed in a negative angle with the mid-line.

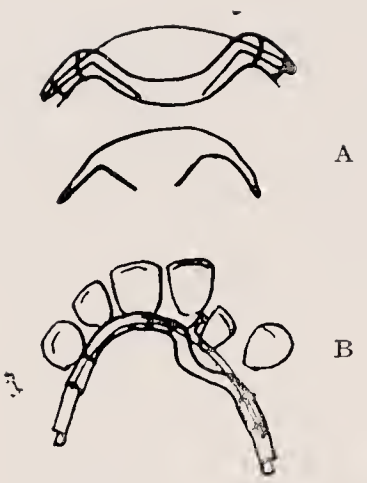


Fig. 41

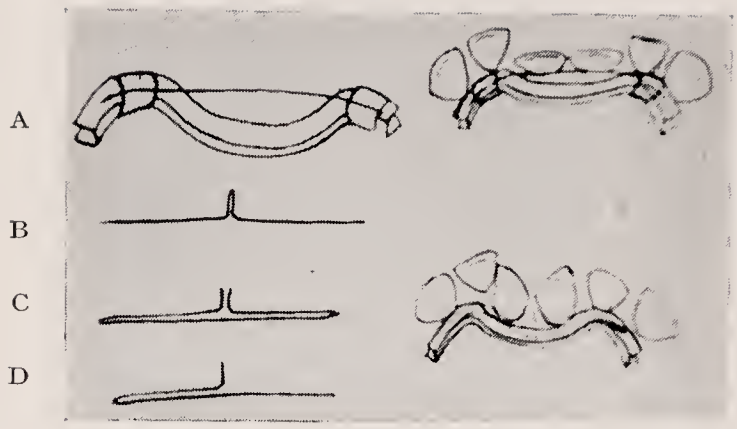


Fig. 42

Fig. 41. Mesial movement with expansion spring. a. simple expansion spring ; b. reinforced expansion action.

Fig. 42. Mesial movement at the level of the incisors. a. simple spring ; b. spring with median spur ; c. recurved spring acting mesially and also distally ; d. unilateral, mesial and distal spring.

(2) A spring acting in contraction, gliding in a tube with a positive angle with the mid-line.

Spring Acting in Expansion.

The open tube runs along the dental arch and adapts itself exactly to the irregularities of the arch. The spring is merely gliding through the groove. This method can be used for correcting the linguo-position of the incisors and canines, and, as we have seen, is also an active force by rotation (Fig. 41).

Spring Acting in Contraction.

It is easier to transform the spring than to transform the grooved arch or rigid framework, as, for instance, in a plate. The modification of an expansion wire into a contraction wire can be effected by mere bending or by full loops. If we want to increase the contracting power, we have only to flatten the wire by hammering. In order to reduce the friction of the extremity of the spring against the lingual surface of the U tube, it is advisable to soften the end and round it off, but it will be much better to bend the wire in that way so that a large part of the spring arm comes in contact with the tube and groove (Fig. 42).

The position of the little U brace is of great importance. The farther distally it is fixed the larger will be the mesial movement of the spring. It is better practice to use a resistant wire slightly activated in order to keep the horizontal direction. A definite advantage of the mesial movement given by a sliding spring is that the movement is rectilineal, contrasting with the curvilineal movement of the usual springs.

Usual Appliances.

(1) Simple mesial spring used in cases of linguo-position of the front teeth (Figs. 43, 44).

(2) Mesial spring with expansion at the front. In many cases a slight expansion is needed before the front teeth can come forward.

It has also a vertical movement (Fig. 45).

(3) Reinforcement of the mesial action. On a usual mesial spring the mesial action can be reinforced by the action of the extremities of the spring wire (Fig. 45a).

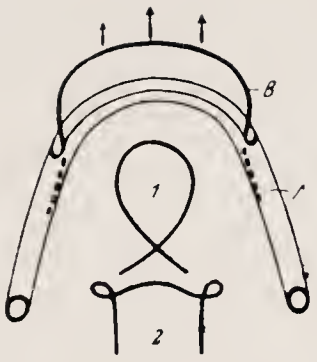


Fig. 43

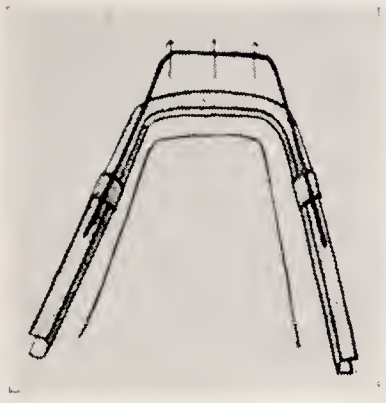


Fig. 44

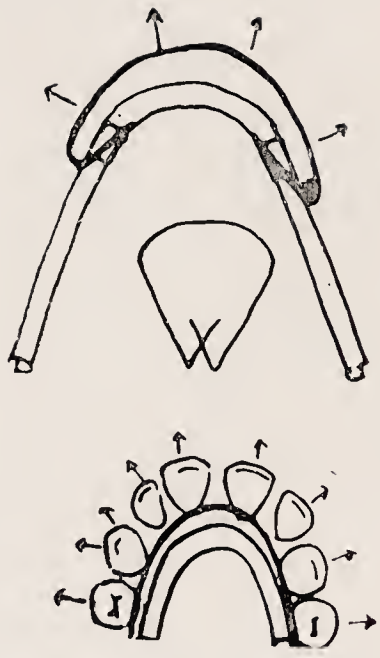


Fig. 45

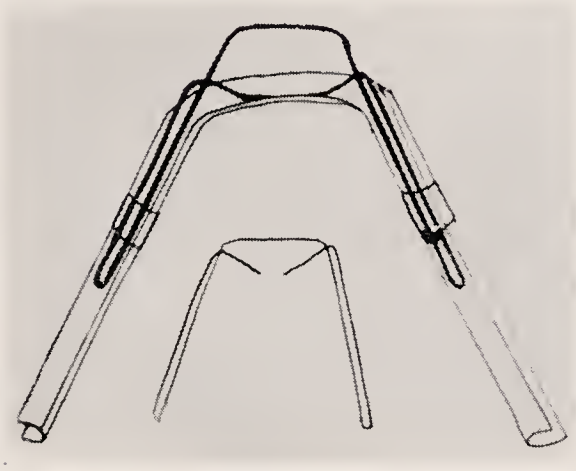
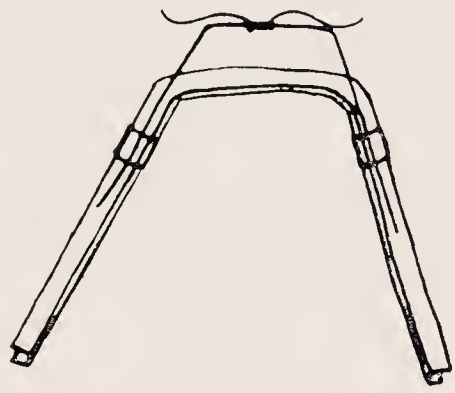


Fig. 45a



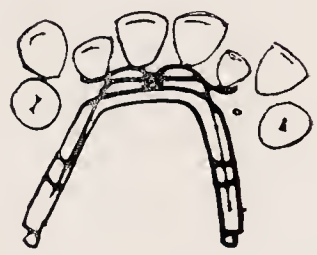


Fig. 46

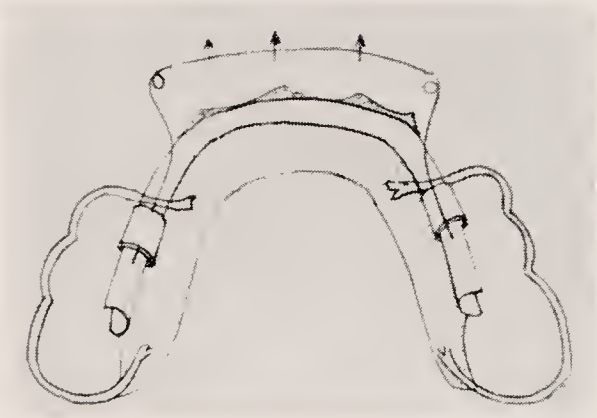


Fig. 47

Fig. 48

Fig. 43. Mesial spring acting on contraction. 1. Simple form ; 2. Contracting spring with loops.
Fig. 44. Normal mesial spring. The spring has the same form as the guiding tube but is slightly narrower.
Fig. 45. Mesial contraction spring giving expansion of the front.
Fig. 45a. Double mesial spring. The mesial action is reinforced.
Fig. 46. The mesial action is localised.
Fig. 47. A plate with mesial spring.
Fig. 48. Mesial movement of incisors.

(4) Localisation of the mesial action. In some cases it is necessary to have an exact localisation of the mesial action. This can be done by joining to the gliding spring a simple finger spring (Fig. 46).

(5) Linguo-vestibular mesial spring. In some cases the bite is so closed that it is nearly impossible to use finger springs on the lingual side of the incisors. In such cases we can use linguo-vestibular springs in the same way as the distal spring. Of course, all the existent forms of mesial springs can be used with the grooved arch. The grooved arch will present a peculiar advantage by protecting the springs in its groove during its action (Figs. 47, 48).

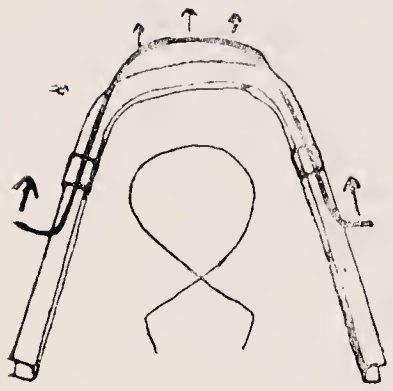


Fig. 49

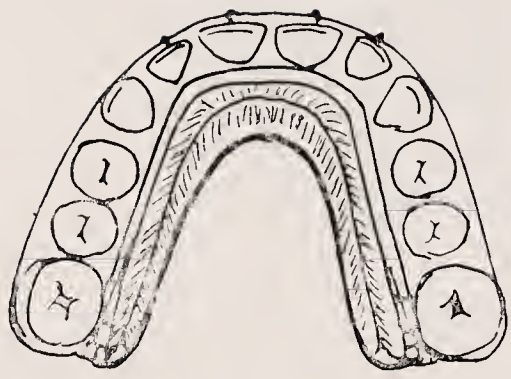


Fig. 50

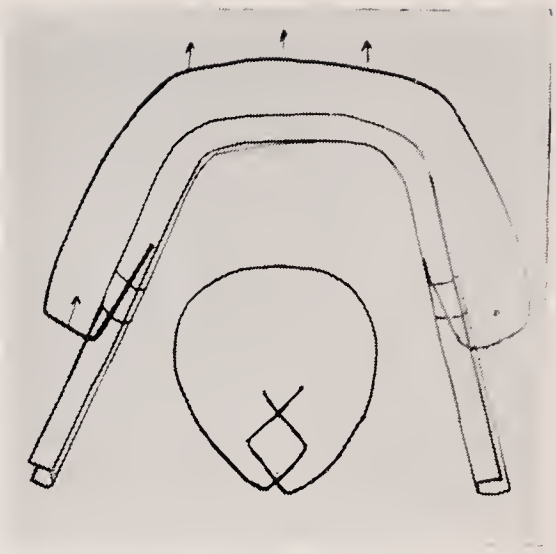


Fig. 51

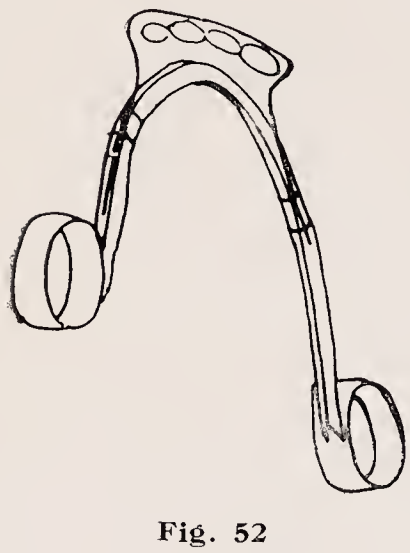


Fig. 52

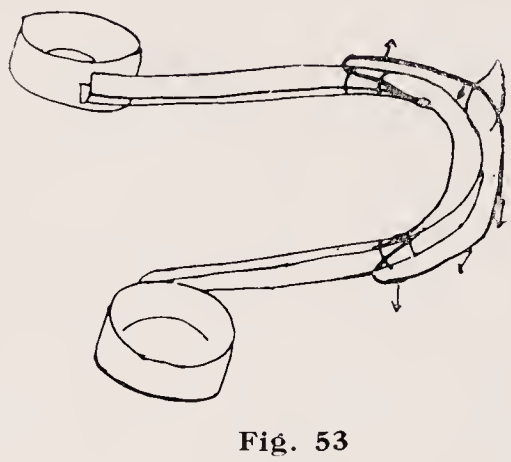


Fig. 53

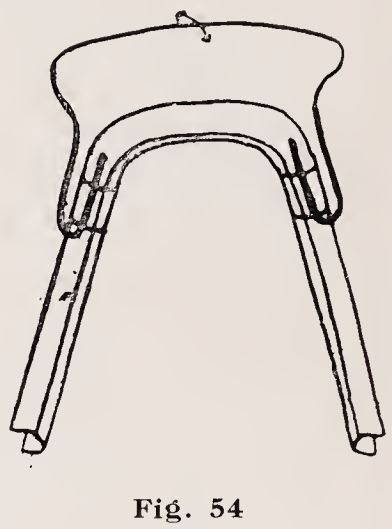


Fig. 54

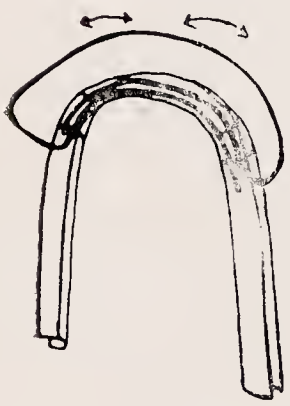


Fig. 55

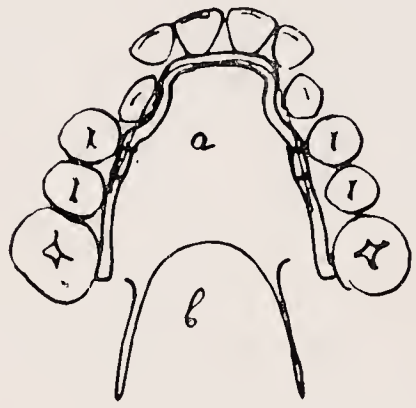


Fig. 56

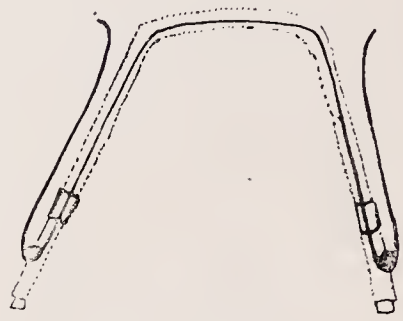


Fig. 57

Fig. 49. Mesial movement of the premolars.
Fig. 50. Mesial movement of the molars, premolars and incisors.
Fig. 51. Mesial movement of the whole premolar and incisor groups.
Fig. 52. Vestibular vertical spring.
Fig. 53. Lingual vertical spring.
Fig. 54. Vestibular vertical spring.
Fig. 55. Lingual vertical spring.
Fig. 56. a. Simple expansion spring ; b. Recurved expansion spring.
Fig. 57. Recurved expansion spring for premolars and canines.

Mesial Movements of Premolars and Molars.

(*a*) The mesial movement of premolars can be obtained by recurving the end of a contraction spring in such a way as to grasp the distal side of the tooth (Fig. 49).

(*b*) There is also a possibility of having a mesial movement of the whole premolar and molar group, together with the incisors, by means of a vestibular contraction spring combined with a lingual contraction spring. In that case it will be necessary to dispense with a solid anchorage. This method might, perhaps, be useful in cases of upper retrusion (Figs. 50, 51).

Vertical Movements.

It will be an easy matter to obtain appreciable vertical movement without opposite reaction on the anchor molars by the linguo-vestibular spring. If we create a genuine vertical movement, we have only to give to our grooved arch a parallel direction to the mid-line, eliminating the sagittal movement of force (Fig. 52).

But in several cases not only a vertical movement but also a sagittal movement is needed. All the sagittal springs are applicable to a vertical movement, and can be used for intruding or extruding incisors. So it is possible to have a linguo-vestibular spring with vertical movement and distal action, and a lingual mesial spring with vertical movement either extruding or intruding (Fig. 53).

If the direction of the grooved arch can be changed, we shall have, of course, a real vertical movement (Figs. 44, 45). As the vertical movement is produced not by the sagittal action but only by torsion of the spring, it is very easy to produce that torsion deliberately. For intruding movements it will be easy to have the spring acting in an exact way because of the lingual face of the tooth. For extruding movements it will be better to use bands and spurs or brackets.

Expansion.

Expansion is the most frequent of the movements needed in treatment ; it is also the easiest movement of all to produce. Our grooved arch will give a good expansion of the molars when used as a simple lingual arch. With plates all sorts of methods can be used. With our appliance transverse movement can be given by :

(*a*) A spring acting on expansion.
(*b*) A spring acting on contraction.
(*c*) A free expansion spring.
(*d*) A spring acting on torsion.

Expansion of the front part.

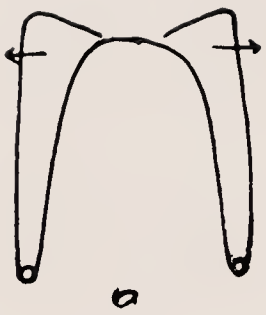
Canines.

(*a*) With lingually placed canines a simple expansion spring will clear up the matter (Fig. 56).

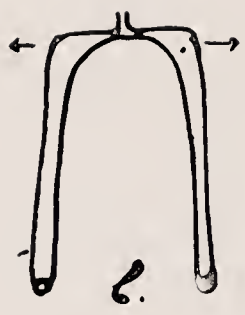
(*b*) With canines in anteversion, a distal recurved spring will expand the canines and correct the inclination of the long axis.

(*c*) When a genuine transversal movement is wanted, we can use the recurved end of the spring as a free spring but fix the end to prevent a mesial force (Fig. 57).

(*d*) We can also give a slight mesial movement to the canines, using the ends as a contraction spring.



A



B

Fig. 58

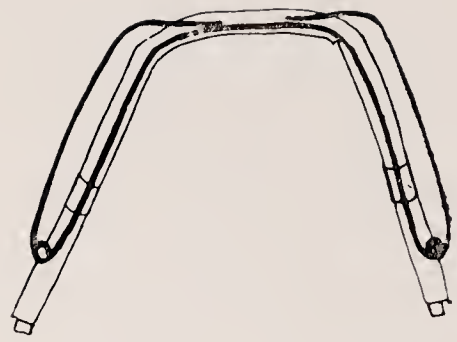


Fig. 59

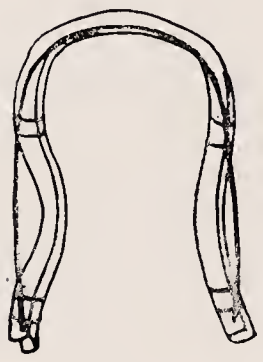


Fig. 60

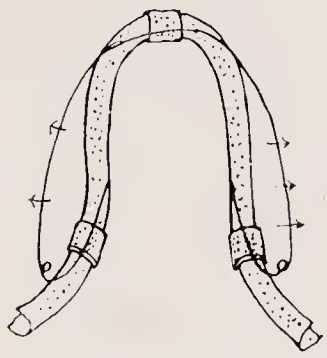


Fig. 60a

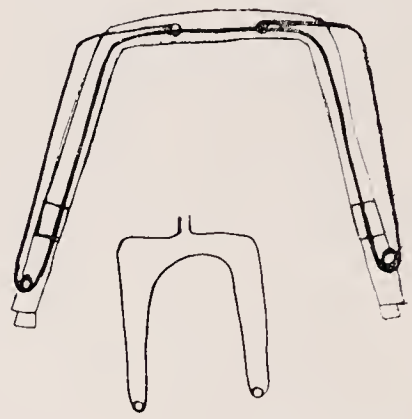


Fig. 60b

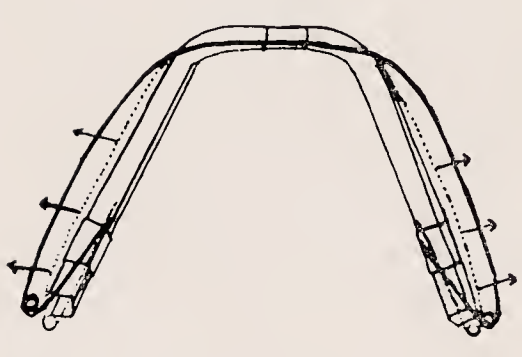


Fig. 61

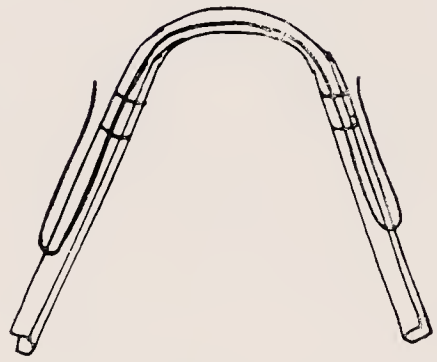


Fig. 62

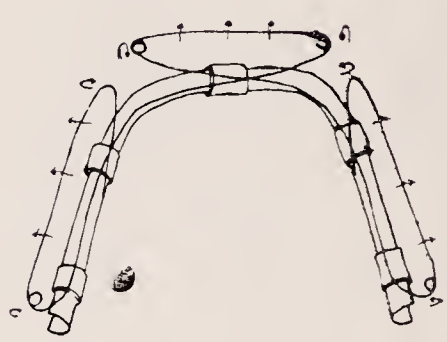


Fig. 63

Fig. 58. Recurved expansion spring for premolars, canines and incisors a. Reinforced expansion spring ; b. expansion spring for canines together with a distal movement of the incisors.

Fig. 59. Reinforcement of the expansion force of the recurved spring.

Fig. 60. Simple expansion spring for the region of the premolar.

Fig. 60a. Recurved expansion spring for the region of the premolars.

Fig. 60b. The expansion spring glides by means of loops in order to prevent mesial movement of the extremities.

Fig. 61. Recurved spring glides by means of loops for expansion in premolar and canine regions.

Fig. 62. Recurved expansion spring for premolars and canines.

Fig. 63. Torsion spring for the general coronal expansion of the whole arch.

Expansion Movement of Incisors.

Expansion of the central incisors by a recurved spring with spurs in the median line (Fig. 58).

Expansion of the Premolar Region.

(*a*) By a simple expansion spring (Figs. 59, 60).
(*b*) By a mesial spring (for unilateral cases).
(*c*) By a recurved spring (Figs. 60a, 60b, 61, 62).
(*d*) By a torsion spring.

Expansion of the Molars.

By a torsion spring.

General Coronal Expansion of the Whole Arch.

Specially useful for the lower jaw with coronal linguo-version of all the teeth, as in the case of close-bite (Fig. 63). Can also be used with removable plate.

There still remains a large selection of combinations of the grooved arch with all sorts of existent forms of springs and other auxiliaries. The grooved arch can be used with single springs, with reflex springs, and with all sorts of plates, such as Badcock plates, Coffin plates, Andresens appliances, etc. We can, in fact, say that the potentialities are unlimited.

Discussion

The PRESIDENT said that obviously they had listened to a master at his subject, and he took the opportunity of complimenting Dr. de Coster on being able to put his case so well in a language other than his native tongue ; he was sure that they would all agree with him, that it was a very great *tour de force*. He, himself, was not in a position, he was afraid, to discuss technicalities, especially in regard to the apparatus, but he was sufficiently able to appreciate it, and to understand the amazing clarity and beauty of those diagrams which had been shown. The work involved to have prepared such a paper must have been immense. He hoped they would now hear some interesting remarks from those better able to discuss both the anatomical parts of the paper and the many attractive suggestions which had been put forward. The distal movement of the molars, for instance, was something, he fancied, not uncontroversial. He proposed, therefore, to throw the meeting open for discussion.

Mr. H. CHAPMAN, initiating the discussion, said how much he appreciated Dr. de Coster's visit to their Society, as well as his work in preparing the excellent paper and demonstration. It might seem out of place in opening a discussion, to enter into personalities, but the earlier part of the President's remarks reminded him of one or two things : he, the President, had said that it was a *tour de force* that Dr. de Coster could speak in another language so fluently ; he (Mr. Chapman) understood that Dr. de Coster had only spoken in English for four years. Not only that ! Dr. de Coster would be speaking in Paris at Whitsuntide in French, and he had been giving a post-graduate course in Holland at which, they might presume, he spoke in Dutch ! And he further understood that Dr. de Coster would be at Bonn, speaking in German, later in the year ; so that they would see he was not only a master of orthodontics but a master of languages too. It made one wonder what better ambassadors for international peace could they have than men like Dr. de Coster. The paper to which they had just listened dealt with abnormal forward movement of the upper permanent cheek teeth, not being due to premature loss

of the deciduous teeth. He remembered some years ago, when Dr. Lundstrom was visiting them, he showed such a case and he (Mr. Chapman) believed that Dr. Friel also had shown such cases, and, as far as he could recall, the only way of diagnosing the condition was not by the loss of space anteriorly but by the medial inclination of the teeth themselves. The difficulty of knowing how to diagnose these cases had been pointed out to them, and he had been very intrigued to learn Dr. de Coster's method by means of the zygomatic process. What was the relation of this process to the first permanent upper molar ? It is almost certainly a variable relationship in a young normal individual. How could the relationship be determined with sufficient accuracy ? He, himself, had used, and did use the zygomatic process as a landmark in teaching, to point out that the medial surface of the first upper permanent molar teeth corresponded with the anterior surface of the zygoma. Then again, in other races, negroes for instance, the molar was very much in front of it so that, evidently, there were as great variations in the normal in regard to this point, as to others. It would seem to him that by means of tele-radiographs it must be extremely difficult to make a diagnosis which was in any way exact. He would like, of course, to see a further series of cases, so that they could really judge of how far that landmark was reliable. Then again, was one to understand that these teeth moved vertically through the bone or did they move by inclination ? In Dr. Lundstrom's cases they were diagnosed—he was speaking from memory—by the inclination forward of these teeth. He did not gather from Dr. de Coster's paper that he used that method, but Dr. de Coster mentioned that he could diagnose these cases, but he, personally, did not know how and it would be very nice if they could have that inserted as a footnote, when the paper was finally printed. Dr. de Coster admitted that the diagnosis presented difficulty but described, as the cause of the condition, lack of synchronisation between bone-growth and dental development ; it did seem to him to present some difficulty to realise that this medial drift could occur when all the teeth were present, as he suspected was intended, and one would like to know what was the conclusive evidence that it did occur to which the author referred at the end of his third paragraph, and what was the percentage of such cases that came to them for treatment. The author said that at maturity extraction would be indicated. That being so, why should not one extract at the beginning and so save all the trouble of moving all the cheek teeth back, only later to remove the most distal of them ?

It was perhaps well for them to be reminded from time to time that medial movement could not be corrected by expansion—a very prevalent idea. It was difficult to believe, however, that the force of this medial movement was so great that it required a counter force to oppose it and prevent it from becoming an abnormality. He put this in as an aside, and apologised for the digression. When he first read the paper it had seemed inconceivable to him that distal movement of molars could occur without anchorage, and he had wondered if it were possible that the appliance held the anchored tooth *in situ* whilst growth carried the anterior teeth forward. Whilst he was convinced that it could be done, after hearing the paper, he still failed to realise how it came about. At the moment, it was inconceivable to him that teeth could be regarded as behaving like bodies in a groove, and that when an expansion arch was attached to these bodies that they should move distally, yet Dr. de Coster seemed to have proved that it was so. The author had implied that the lack of synchronisation of bone growth and dental development affected only the cheek teeth, but that, in turn, caused the upper anterior teeth to be crowded. Why was only

one area of the dental arch picked out ? And why was there no effect on the lower arch ? There was one sentence in the paper which had struck him forcibly, and that was : " If it is true that our force can stimulate the growth of bone." That very statement made him think Dr. de Coster had some doubt about it, and he ventured to say no one had ever proved that appliances caused bone to grow. It was a coincidence that whilst Dr. de Coster was reading his paper on the subject, Dr. Spencer Atkinson of Pasadena was advocating the same type of treatment. Only recently, he had seen an orthodontist from California, who had been working with Dr. Spencer Atkinson, who told him that the latter, too, was recommending distal movement of all the upper posterior teeth. He had recently had the opportunity of a talk with Dr. Wilkinson of Melbourne, who had recently seen Dr. Atkinson, and who had expressed his admiration of the work which was being done by the latter, and he (Mr. Chapman) had had personal appreciation of this type of treatment from Dr. Taylor of Hollywood, who had adopted it. He was, perhaps, less inclined to say than when he had first read the paper, that he was unable to see the advantage of such treatment. But if a tooth had to be removed later, the object of which appeared to be to give the six anterior teeth sufficient room, he could not see why the first premolar should not be removed when it erupted and the necessary room given to the anterior teeth in that way. After hearing the paper he had, perhaps, a little more doubt about the advisability of that, though he was free to confess that he was not fully convinced about the treatment yet. If his discussion and criticism had appeared rather more destructive than constructive, he did not want it to be assumed that his object had been other than to put the matter in such a way that the author could clarify some of the obscure points still further. He was particularly grateful, in fact, they all must be, to Dr. de Coster for introducing the subject which was exercising the best brains not only in this country, but also in America. He was full of admiration for Dr. de Coster's ingenious appliances which he had had the opportunity of seeing at several meetings previously, and he was glad to make a further acquaintance with them and with their uses.

Mr. Russell Marsh said he would like to render his thanks to Dr. de Coster for the brilliant paper he had given them, which undoubtedly contained a tremendous amount of hard work. What Dr. de Coster had said in the earlier part of his paper might seem to them rather theoretical, but those of them who knew, realised that it was backed up by a tremendous amount of experience over a long period of time, and there was no doubt from the second part of the paper about the technical knowledge he brought to bear on his work. He quite agreed with all the mathematical calculations Dr. de Coster had come to. He recognised that he was not in a position to disagree with any part of that at all. Many years ago, at the time of his matriculation, he must have known something about cosines and sines, but nowadays he only used them in crossword puzzles. He thought a lot of them, that evening, had been rather puzzled by certain of the formulæ, but he felt these had probably been clarified to some extent by the lantern slides they had seen. One of the fundamental difficulties in their orthodontic treatment had always been the movement forward of the molar teeth and he had felt that when expanding they had made the mistake of allowing the forward drift of the molar teeth to use up whatever space they were trying to obtain. They had expanded laterally, hoping to get a little more space in the front of the mouth and, as they expanded, these molar teeth inclined forward simply absorbing the space they were trying to make. They thus found there was no space in front gained by expansion, although they had widened the

arch. With fixed appliances they got a more fixed expansion and thereby they did gain some little space in the front of the mouth. Anterior expansion was the only way to get considerable space and thus controversy arose as to whether, in th e treatment that he had described, Dr. de Coster really moved back the molar teeth or whether he did, which was equally important, prevent them from moving forward, and, at the same time, gain a certain amount of space by antero-posterior expansion. He was inclined to think that a good deal of it was slight forward expansion and the preventing of the molar teeth coming forward. He did not quite follow, from the photographs, exactly how the appliances were made to operate which performed a vertical movement of the teeth. He did not understand whether this was a vertical and inclined movement or whether a purely vertical movement. He did not know whether any of his colleagues there present had noticed that there seemed to be a general tendency for children's teeth to erupt too early—or at least earlier than they had been taught to expect them. He himself very seldom came across a case of a child in which the laws of the text books had been obeyed, to within a year. In fact, he found the incisor teeth coming between the age of $5\frac{1}{2}$ and 6 years, rather than at the age of 7, as laid down in the text books. He was not prepared to assume that all the text books were wrong, but he was inclined to think that children's teeth now erupted earlier, and were, therefore, more delicate and less resistant to decay, and his experience was that when teeth erupted a little later, they were stronger teeth and likely to be in proper conformation with the arch. They must understand that the arches were, in some cases, say twelve months, too small for the eruption, and Dr. de Coster had pointed that out in giving the age of the child and the tooth age of the child in contra distinction. He ended by congratulating Dr. de Coster on his excellent paper.

Mr. S. Friel said that the Society was greatly honoured in having had such an eminent personage as Dr. de Coster to address them that night. He was a man of many parts. For one thing, he was famed for a grower of roses. He was also distinguished, as his paper had shown them, in his contributions to diagnosis. His mesh scheme for diagnosis was a most valuable one. He was also one of the early workers on radiographs. Lastly, he was noted for his marvellous technique, which he had shown them, that evening. He was the first man, as they all knew, to introduce electric welding for stainless steel orthodontic appliances, and probably the first person to use stainless steel exclusively in his practice. With regard to the paper, there was only one point on which he would like to touch, and that was the distal movement of molars. He felt very nervous about this distal movement of molars and his reason for this nervousness was fear of impaction of second or third molars. Recently, during the last few months in fact, he had heard of four cases of his own which he had considered he had treated successfully, and which, at the time of eruption of the third molars had collapsed to a very large extent. In those cases he did not push the molars distally, and he thought that if he had done so, the position might have been something even worse. Assuming that Dr. de Coster did move the molars backwards, he thought they would be getting into this difficulty ; but he thought that this was, to a great extent, an assumption. During the last fortnight he had received a reprint from the *Anglo-American Orthodontist* of four papers of addresses given by Dr. Brodie, Dr. Downs, Dr. Goldstein and Dr. Myer of the Department of Orthodontia, University of Illinois. They had treated a series of cases grouped according to classification 1, 2 and 3, and in the beginning of each case they stated what they proposed to do and then, at the end, they

gave the results. The series of experiments had been controlled by tele-radiographs which had been orientated in three radiographs, one before the treatment ; one at the end of the mechanical treatment and one a good many months later. If he might, he would like to read a few lines of these cases and their results : "Experiment (1) To establish lower arch formation ; (2) To set the upper buccal teeth distally to gain adequate arch length. Result : Upper 6 has moved forward .5 mm. *Summary :* In only one case was any appreciable distal movement of the upper molars demonstrable. This was possibly due to the fact that no X-rays were taken at the end of the distal movement. This was now being investigated and would be reported later." He thought it was quite possible that a lot of that movement was a forward movement of all the anterior teeth. Perhaps Dr. de Coster would be able to show, by these tele-radiographs whether he was actually moving the molars distally. He was very grateful to him for a most entertaining lecture.

Miss L. M. Clinch said there were two points in the paper which she would like to understand more clearly. At the beginning of the paper, Dr. de Coster had given as one of the reasons for the distal movement of the molars their being moved into the part of the bone where stimulation of growth would be effective. Now, Dr. Selmer-Olsen had shown that it was impossible to stimulate bone growth by any orthodontic force. Obstructions could be removed, and then, if the urge to grow were there, the bone would recover or partially recover. But if the urge to grow were not there, it could not be produced. Secondly, it was clear that in many cases it must be wrong to attempt to correct the condition by forward movement of the anterior teeth, but she would have thought that it was in these cases that extraction of premolars was not only permissible but desirable ; then the anterior teeth could be moved back into their correct positions without the distal movement of the molars which would be followed later by their extraction. There was one thing in particular, for which she would like to thank Dr. de Coster, and that was the introduction of welding of stainless steel for orthodontic appliances. She thought that nobody with experience could doubt that steel was a far more efficient material than any of its predecessors, and its cheapness had made it possible to experiment to one's heart's content, so that the technique of appliances had improved a hundredfold. She would like to thank him for a most interesting evening.

Mr. G. F. Cale-Matthews, saying he would obey the President's request to take part in the discussion, remarked that he had had the pleasure of seeing Dr. de Coster's work in his practice and he was not surprised that he had given them such an evening, an evening of controversy and delight. He would not attempt to criticise ; that had already been done by others ; they wondered whether the molars could be moved backwards. He himself was not going to enter into any controversy, but was not Grieve the originator of the practice of distal movement of posterior teeth, many years ago, and hadn't he given it up ? He did not think many of them there would attempt to move back molars by mechanical force. He thought they should be grateful to Dr. de Coster for the marvellous mechanical drawings and appliances which he had brought to them, and he knew that Dr. de Coster was going to give them a personal demonstration of these. Nothing, therefore, that he could say would interest them more than Dr. de Coster's demonstration, so he would conclude by recording his thanks to the lecturer.

Mr. H. G. Watkin said that he would like to add his thanks to those of the previous speakers, and to assure Dr. de Coster how

indebted they all were to him for his very interesting paper. He had had the pleasure, last year, of meeting Dr. de Coster in Belgium, and discussing his apparatus with him. Since then, Dr. de Coster had developed the subject more. Most of all, they must all thank him for taking up the use of stainless steel. There was just one thing he would like to mention and that was, that in all the springs which had been shown, Dr. de Coster seemed to have cut out all the reaction of the spring itself. Mr. Watkin then drew a sketch of Dr. de Coster's open tube lingual bow appliance in which the ends of the spring wire were so adjusted that they were exerting a pressure lingually on the diverging arms of the main bow. This lingual pressure was balanced by the outward pressure of the main bow, but a component force acted, pushing the spring wire forward. To this forward pressure there must be an equal and opposite backward reaction. He would like to ask Dr. de Coster what he did with this backward reaction. Exactly the same thing happened if you expanded the outside arch. The force would be reversed, pulling the incisors backwards and the other would also be reversed, pulling the molars forward. How was it possible to prevent the reaction which was unfavourable? He would like to know if Dr. de Coster found that the lock he used for molar bands encroached—overlapped—the end of the tube. He thought that this would rather encourage caries between the end of the tubes and the lock. Most of them would agree that they had now discarded any kind of screwing apparatus for molar bands because of cases of caries. In conclusion, he would like to say that he personally, had enjoyed Dr. de Coster's paper immensely, and the ingenuity displayed in all his appliances was truly marvellous.

The PRESIDENT said that as time was getting on, and as they were all anxious to see the many appliances which were on view, he would ask Dr. de Coster to reply to the questions which had already been put, without further delay.

Dr. DE COSTER said he believed that they could put the main objections which had been raised together under one or two headings. The first question was: "Do molars actually move backwards?" He did not believe it was a question of much importance to find out if the molars went backwards or whether the molars remained in their own place, the neighbouring skeletal structures growing forward. They would note that there were two sorts of molar movement, the forward movement of the bone and also the forward movement of the teeth. He supposed that the movement of the teeth and their progress forward was greater than the forward development of the bone. The forward movement of the teeth and the forward movement of the bones should be the same, and at a certain moment there would be a normal relation between the teeth and the bones. It was also very difficult to calculate —to measure the real movement of the teeth during treatment, because of the change which was taking place in the anatomy of the bones of the face. For instance, if the relative planes were changed, other results would be obtained. He had been asked a question about the measurements. Well, measurement was erratic. They had no fixed point in that method, as all the points were movable. They could, of course, find the relative movement of the different points, the one to the other, by the direction. He could not, himself, prove the movement of the tooth, because there was not an anterior movement at the same time without a vertical movement. All the planes—that was, all the occlusion planes, changed during the time of treatment. And there might be two, three, or even up to seven years of treatment. During that period, all the planes changed and it was impossible to measure the movements made by the teeth. There was another

point which had been raised, and that was the reaction. For the distal movement the spring would create an anterior movement of the U tube, but the anterior movement could be prevented by attaching a closing U tube to the arch. The reaction of the rigid framework was dispersed over the whole arch and action was pointed only on one tooth. In regard to mesial movement, they had the occlusion at the first molar ; the molars had stronger resistance than the incisors. Also, they could, if they liked, fix not only the molar but fix the premolar, and so prevent distal movement of the molar. He thought he had answered all the questions which had been raised, and if there were any left unanswered they must forgive him. He had done his best to recollect all the questions.

Notes supplied by author after further consideration of questions asked.

Owing to lack of time and to the difficulty of language, I was not able to answer in an adequate manner the important questions put by distinguished members. The main controversy surrounds the theoretical part of the paper and in particular the question of the mesial position of the first molar, and the distal movement of that molar.

The study of a developing child is a problem of relativity. The final result of that problem will be the adult morphology.

The study of an abnormal development is only research into the unusual curvature in that trajectory.

In the study of the growth of the face we have to consider two parts, the skeletal base and the dental system, or the growth of the skeletal base and the instalment of two successive sets of teeth on that base.

Growth must be studied from two aspects : volume (bulk) and rhythm. A disturbing factor will at first influence the rhythm and afterwards the bulk of growth.

In a normal individual it is supposed that the skeletal development and dental instalment have taken place in a right manner ; exact bulk at the correct time ; both keeping the necessary synchronism.

The osseous growth affects the position of the dental bodies because the changes of the mechanical base ground must have a direct bearing on the mechanical position of the teeth (line of power of the muscles, etc.).

If the bony growth is too late according to the instalment of teeth not only the necessary room will be lacking, but the teeth will have had neither the necessary time, nor the needed room to perform their pre-eruptive and eruptive movements. The teeth will become installed in a skeletal mould insufficiently organised. The agent of power will be too strong and too heavy for the supporting base, as a too heavy hammer on a weak anvil. The teeth are obliged to deviate because the supporting base is mal-adapted and the muscles too weak for that heavy organ.

The whole eruption period of the permanent teeth is a dangerous one on account of the instalment of the new power agents, larger and heavier than before. The mastication area grows larger and if the resistant base remains the same or lags behind, the teeth are obliged to crowd or urge forward. At this point we come to the question of the mesial movement of the first molars.

Is it a fact, that in some cases the first molar is driven excessively forward ?

We can ask the question in another manner ; is it a fact that in numerous cases, the first molar is occupying, according to normal anatomical landmarks of the skeleton, a too mesial position ?

I believe we can answer that question affirmatively.

The mesial position is caused :—

(*a*) Either by a retarded skeletal development of the face

according to the instalment of the permanent teeth or by a too early eruption of the teeth themselves.

As the growth of the face has a sagittal and vertical direction, the slackening of that growth provides a relative mesial position of the teeth.

(*b*) Or by the forward movement of the teeth themselves. Normally the forward movement of the teeth and principally the molar goes on at a quicker rate than the forward movement of the bone. The variable relation of the key ridge to the molar from childhood to adult age is a due proof of it.

In the cases where the osseous development is lacking and the forward movement of teeth going on, the result will be an apparent mesial movement of the molar, the molar being the first permanent tooth of the lateral part and also the most important of the series. One might ask if that movement is strong enough to push the other teeth forward at the eruption period of the six year old molar. The alveolar wall is in a steady state of transformation, the deciduous front teeth have their roots at least partly resorbed, the deciduous teeth are separated and the arch no longer presents a serious resistance. In the cases where neither the roots are resorbed, nor the deciduous teeth separated, we can meet with resorption of the distal root of the deciduous molar. In other instances the germs of the permanent teeth are pushed forward through the weak medullar bone. The final result will vary according to the rate of evolution at the moment when the mesial movement sets in.

The molar is obliged to erupt, to sink down and to change the direction of its long axis, wedged by the pterygoid processes at the back and the zygomatic process at the side.

How can that mesial movement be recognised ?

Clinically we observe the relationship of the molar to the lower molar. The transversal width is shortened while the transversal occlusion seems correct, provided that the lower jaw is correct.

The occlusal radiograph shows the crowded position of premolars and cuspid while the key ridge points to a position of the arch situated too far backward according to the age of the patient. When for instance the key ridge lies at the mesial root of the first permanent molar at an age of eight, the situation cannot be recorded as normal. The tele-radiograph of the face shows an under-developed face, the heavy dental system, the mesial position of the molar according to the key ridge, the insufficient straightening of the long axis of the molar, the forward inclination of the premolars and canines, and the rather short apical base. But all this permits a mere presumption.

How do we make the diagnosis ?

By the mesh method. The lines of the network for each period of development fix the relations of dental bodies and osseous landmarks in normal conditions. The distortion of lines which we are obliged to perform on our mal-occlusion cases in order to keep the relations of anatomical points and network lines represent the deviation of the anatomical points one with another and each of them with the general structure of the face. During the last months, instead of taking into account the chronological age of the subject, we use only as age period the maturation age recorded on the wrist radiograph. This method gives us a very striking proof and shows in most cases a relatively over-developed dental system. We may note that the mesial movement does exist also in the lower jaw.

How is the therapeutical distal movement of the molars effected ?

I believe I have demonstrated a distal action by the simple lingual arch and how it is effected. The first result of that force will act on

the molar as a torsion action—torsion around the palatal root. The subsequent movement is rather a distal tipping.

Does the molar really go backward?

I believe we can answer "Yes" for some cases. In other instances it is rather the neighbouring structure which is undergoing a change. If a distal force is acting on the molar it will at least prevent the molar from performing its normal mesial movement whilst the skeletal-bone is growing forward and downward. At the European Orthodontic meeting at Bonn, I shall show this general structural transformation with radiographs taken before and after treatment. If the molar remains in its former position whilst the nasion point is growing forward, while the occlusal plane is changing its inclination, while the nasal spine is going forward and downwards and while the apical base is enlarging, the proposed result is obtained.

Is it possible to measure that distal movement?

In some cases that distal movement can be measured on the model. It can also be done on occlusal radiographs. Tele-radiographs studied by the method of superposition show numerous variations according to the registration point. If, for instance, the points are superposed, and the head orientated on the Frankfurt plane, we shall have a manifest distal movement. The younger the patient, the larger will be that apparent movement.

When the nasion point has a great importance for our æsthetic clinical judgment of the profile, that apparent movement has to be considered. Thus, after treatment, the molar will be situated on a more posterior plane than before, according to the profile.

The method of superposition proposed by Brodie is a method of analysis of the skeletal transformations. The transformations demonstrated represent all the changes brought about both by treatment and by natural growth. The rather small changes shown by Brodie are due to the fact that the patients were not very young and the treatment was begun after the instalment of the permanent dentition. The network method is able to separate both kinds of structural changes.

Do we influence the growth processes by our treatment?

I do not think so.

Does the distal movement create a danger of impaction?

If growth is going on normally, impaction will not occur. I believe impaction is due to an arrested or retarded bone growth.

Would it not be better to extract rather than push the molars backwards?

If the mesial movement should have as its only inconvenience the crowded position of the front teeth, extraction would be better, but the mesial position of the teeth has a direct bearing upon the whole structure of the face, upon the powerlines of the muscles, upon the direction of the skin fibres, the development of the sinuses, etc. Excepting the very difficult cases and also old cases, I think it is better practice to produce the distal movement in order to restore the normal physiological face and the normal function. After the face has passed its development phase, it may be justifiable to extract in order to restore the rearrangement of the front teeth.

The PRESIDENT said he thought the best way to proceed, at that juncture, was officially to close the meeting and Dr. de Coster would then be at their disposal to help them all he could. He would finally put to the meeting a very sincere vote of thanks to Dr. de Coster and to those who had taken part in the discussion that evening. He was sure that they would all agree that it had been a very enjoyable evening.

The PRESIDENT intimated that the next meeting of the Society would be a Demonstration Meeting, and would take place on May 1st, 1939.

The meeting then terminated.

*Demonstrations**

SERIAL MODELS TO SHOW (a) SOME PHASES OF NORMAL DEVELOPMENT OF OCCLUSION AND (b) THE FINAL AND PERMANENT RESULTS OF TREATMENT

By Harold Chapman, L.D.S.Eng.

SERIAL models were shown of—

(*a*) Normal Development of Occlusion,

(*b*) The results of treatment some years after the wearing of any appliances, with the object of comparing the natural changes with those obtained by treatment.

It appeared that Class I cases, treated by enlarging the arches and retaining all the teeth, were not widened permanently more than normal cases widen during the same period, whether compared with actual cases or with the measurements obtained by Smythe and Young, as given in "Facial Growth in Children."

The demonstrator made the point that arches which are too small cannot be enlarged permanently by artificial means to accommodate all the teeth in good alignment. There are exceptions to this rule, one of which is the widening of the upper arch in the cases referred to in the next paragraph: others are referred to in a paper already published.†

The demonstrator also exhibited cases of Class II, div. 1, with the object of showing that postnormality is curable and that in these cases the arches may be normal in size when all the teeth are kept, the upper arch being widened to occlude correctly with the lower arch (originally of correct size) in its new and forward position; this is an example of widening the upper arch which is permanent. The arches may be small in size, however, as in Class I, in which case, if all the teeth are kept, there is bound to be some imbrication. The degree of imbrication depends on the degree of smallness of the arches—if the smallness is slight, then the degree of imbrication will be slight, and it may be a matter of opinion if any, or one or two, upper teeth should be removed: if the smallness is more severe, it will be necessary to remove two upper teeth and perhaps two lower ones.

The over-bite, which is typical of these cases, appeared to be corrected when the appliances were removed, but this seemed to return a few years later, resulting in imbrication of the lower incisors.

† Chapman, Harold. "When Orthodontic Treatment to Enlarge the Arches is Indicated." *Trans.* B.S.S.O., 1938 and *Dental Record*, July, 1938.

THE USE OF AN ADJUSTABLE CONDYLE PATH ARTICULATOR AS A DIAGNOSTIC INSTRUMENT IN ORTHODONTICS

By G. H. Ellingham, L.D.S., U.Birm.

THE technique was described of correctly mounting orthodontic study casts in an adjustable condyle path anatomical articulator, the various steps being illustrated with photographs and specimens. Casts of natural dentitions were shown,

* Given before the Society, 1st May, 1939.

mounted in articulators, in which facets had been worn, and it was demonstrated how coincidence of these facets in all movements could be obtained; thus proving that the casts in the articulator could actually make movements identical with those of the natural jaws. A number of cases, so mounted, were shown, illustrating how diagnosis was made easier by the ability to study interference, and such problems as over-bite, lack of vertical growth, etc., at leisure, rather than having to rely on clinical examination of the mouth in a child who might not be able to make his habitual jaw movements at bidding.

SERIAL MODELS FROM BIRTH TO FOUR YEARS

By Miss Lilah Clinch, L.D.S.Irel.

SERIAL models (between birth and four years) were shown, demonstrating the positions of the gum pads which are found at birth and the changes taking place during the eruption of the deciduous teeth.

A MODERNISED EXPANSION PLATE WORN AT NIGHT ONLY

By O. Henry, L.D.S.Eng.

PROFESSOR SCHWARZ, of Vienna, now does all his work with an improved expansion plate, which by virtue of its construction, becomes active during sleep, and is therefore worn at night only.

A ledge is built at the front of the plate, upon which the six lower anterior teeth bite, opening the bite just a little more than the teeth are apart when we are asleep.

The new Schwarz "arrow-head" cribbing works on the principle of the Crozat; also he can use the delicate springs of the Mershon technique, because he leaves an open space in the rubber for the springs to play in.

Further, he uses the Fisher expansion screw. There are four stations to the turn of this screw, each station giving one-fourth of a millimetre expansion: given weekly, this makes a millimetre expansion per month, so adjusted because Oppenheimer, of Vienna, proved that the tissues take more kindly to this degree of expansion.

REPORTS OF MEETINGS

AN Ordinary Meeting of the Society was held at Manson House, 26, Portland Place, W.1, on Monday, February 6th, 1939, with the President, Mr. S. A. RIDDETT, in the chair.

The CHAIRMAN requested the Secretary to read the minutes of the last meeting.

The SECRETARY then read the minutes, which were approved.

In welcoming any visitors, who were not actually members of the Society, the CHAIRMAN said he hoped that they would consider themselves members for the evening, and take part, if they so wished, in any discussion which might occur. Unfortunately, he had a sad duty to perform as one of his first duties in office. Since they last met, the deaths had occurred of Mr. Sydney Spokes and Mr. J. Lewin Payne. By those deaths, the Society had lost two of its most distinguished members, both of whom were past presidents of the Society. He was not, he was afraid, endowed with the gift of tongues, and certainly not able to say anything which would enhance the greatness of these names. Suffice it to say that the mention of them was sufficient for those who knew what contribution they had made to dentistry, and the personality and charm and popularity which they had exercised. Mr. Spokes had been retired for a great many years and had had a very happy life. Mr. Lewin Payne, as they knew, was struck down right in the middle of his active career, and he, the Chairman, thought that most of them remembered Mr. Payne better than Mr. Spokes—although the vigorous signature of the latter appeared on the diplomas of a good many of those present that night. Of the charm of manner and contributions to the profession of Mr. Payne, he would not speak further; he had no doubt that they would be dealt with suitably later on. The Chairman then asked the company to stand for a few seconds, in silence, in memory to Mr. Spokes and Mr. Payne. In the ordinary course of events, said Mr. Riddett, he would not have been their President that session. But, as they knew, owing to serious illness, Mr. Visick had felt he would be unable to attend meetings, and, as the senior Vice-President, he, Mr. Riddett, became Hobson's Choice! Personally, he could not think of anybody whom the Society would be more delighted to welcome as President than Mr. Visick, who had contributed so much to the success of their meetings. He felt they would like to hear news of his progress; in answer to a letter which he had written to Mr. Visick, he had received a cheery reply, part of which he proposed to read to them. The letter was dated January 26th, and read:

> "My dear Riddett,
>
> . . . I'm glad to say I really am getting on very well. I feel fine when I wake up, but not so good at night! But every day I feel better. I am wondering if I shall get up to a meeting before the end of this spring. I hope so . . . With my very best wishes for a most successful and happy year of office,
>
> Yours sincerely,
>
> Hubert C. Visick."

It was good news to hear that there was a chance of having Mr. Visick back with them soon. Somehow, the Society did not seem complete without Mr. Visick's vigorous personality.

The SECRETARY inquired if there were any elected members present whose election had been confirmed at the previous meeting, but who had not yet been introduced to the President.

As there were no such members, the following candidate was stated to have been declared eligible for election by the Council : Miss Cross, 48, London Road, Tunbridge Wells. The candidate was sponsored by Mrs. Lindsay, Mr. Maxwell-Stephens, Mr. Bertram Samuel and Mr. Cutler. She was thereupon elected a member by a unanimous show of hands.

An Ordinary Meeting was held at Manson House, 26, Portland Place, W.1., on Monday, March 6th, 1939, at 7.30 p.m., with the President, Mr. S. A. Riddett, in the chair.

The President invited the Secretary to read the minutes of the last meeting. When this had been done, the President said they had now heard the minutes read, and he inquired if it were the pleasure of the members that he should sign them as being correct.

The minutes were then unanimously passed as correct.

The President said they were very pleased to see some visitors with them that night, and to recognise in their midst a great many distinguished people, many of them visitors from other parts and other lands. He hoped that they would consider themselves members of the Society for the evening, and he was sure that the members present would welcome them into the discussion if they so wished, and would be glad for them to take part in any exchange of opinion that might follow the lecture. He then inquired if there were any members present whose election had been confirmed in ordinary meeting and who had not yet been introduced to the President. On one member coming forward, he was cordially welcomed by the President, and thereafter signed the register.

The President intimated that the following candidates had been declared eligible for election by the Council : Mr. J. E. Keith, L.D.S., R.C.S.I., 13, Upper Fitzwilliam Street, Dublin ; Mr. H. M. D. Archibald, L.D.S.R.C.S., 39, London Road, Reading.

He asked if it were the pleasure of the meeting to elect these members by a show of hands or by ballot, and the meeting decided that a show of hands was preferred. The President then put the names of the two gentlemen to the meeting, and, after a show of hands, declared the members duly elected.

In introducing Dr. de Coster, the speaker of the evening, the President said that as those present well knew, that night was a very special occasion. They were very greatly honoured in having Dr. de Coster of Brussels to speak to them. It did not need any word of his, to introduce to them Dr. de Coster and to enlarge on his eminence in the orthodontic world. It would suffice, however, to say that anything which Dr. de Coster wished to tell them, would be given the greatest attention and respect. Most of them knew that he had a very large and long established orthodontic practice in Belgium. He had very much pleasure in calling upon Dr. de Coster to read his lecture demonstration on " The Distal Movement of the Molar Teeth as one of the First Steps in Treatment, in conjunction with the Practical Technique of a New Automatic Mechanical System."

An Ordinary Meeting of the Society was held at Manson House, 26, Portland Place, W.1, on Monday, May 1st, at 8 p.m., with the President in the chair.

The following candidate was elected a member : H. H. Wydell, L.D.S.R.C.S.Eng., 60, Harley Street, W.1.

The following Demonstrations were given at the meeting :—

Mr. H. CHAPMAN : "Serial Models to show (*a*) Normal Development of Occlusion and (*b*) The Final and Permanent Results of Treatment."

Miss L. M. CLINCH : "Serial Models from Birth to Four Years."

Mr. G. ELLINGHAM : "The Use of an Adjustable Condyle Path Articulator as a Diagnostic Instrument in Orthodontics."

Mr. O. HENRY : "A Modernised Expansion Plate Worn at Night Only."

Mr. CALE-MATTHEWS : "Some Gadgets in Dealing with Difficult Cases."

Mr. O. N. CATCHPOLE : "Some Interesting Cases."

ANNUAL GENERAL MEETING

THE Annual General Meeting of the Society was held at Manson House, 26, Portland Place, London, W.1, on Monday, December 11th, 1939. The President, Mr. S. A. Riddett, occupied the chair.

The minutes of the last Ordinary Meeting of the Society, held on May 1st, 1939, were read and were confirmed and signed.

Regrets for non-attendance were announced from Mr. Headridge and Miss Smyth.

The PRESIDENT said it was his sad duty to report the passing of two more of the Society's past presidents. The death of Mr. Lewin Payne and Mr. Spokes had already been announced to the members, and now he had to announce that Mr. Carl Schelling and Mr. Pitts had also passed away. Mr. Schelling was a romantic figure and his generosities to the dental profession were well known to all the members of the Society. He had represented in himself a link with the great past, having succeeded to the practice of Sir Charles Tomes. He had always enjoyed life to the full and would be remembered with gratitude and affection. All the members of the dental profession were justly proud of Mr. Pitts, whose great intellectual gifts were widely recognised and admired. During the last year or two the heavy calls on his time had prevented Mr. Pitts from attending the meetings of the Society as regularly as the members would have liked him to do. His gallant services to his country and his great contributions to dentistry and to the Society would never be forgotten. He was sure all the members would join in offering their sincere sympathy to the relatives of Mr. Schelling and Mr. Pitts.

(*The members stood in silence.*)

REPORT OF THE HON. TREASURER.

Mr. H. R. EVANS (Hon. Treasurer) reported as follows :—

The subscriptions during the past year have amounted to £276 19*s.* 10*d.*, and the interest received from investments has been £11 17*s.* 4*d.*, making a total income of £288 17*s.* 2*d.*, as compared with £274 18*s.* 11*d.* last year. The expenditure for the year has amounted to £215 19*s.* 4*d.*, a decrease of £76 19*s.* 4*d.* on last year. This shows a credit balance on the year's working of £72 17*s.* 10*d.*

The Society's assets are as follows : £500 National Savings Certificates, at a present value of £642 9*s.* 0*d.* ; 2½ per cent Consolidated Stock, purchase value £400 5*s.* 6*d.* ; cash at bank, £300 3*s.* 0*d.* ; cash in hand, £2 0*s.* 7*d.*, making a total of £1,344 18*s.* 1*d.* This figure shows an increase of £85 2*s.* 11*d.* on the total value of the assets at this time last year.

On the motion of the HON. TREASURER, seconded by Mr. MAXWELL STEPHENS, the report was adopted.

Report of the Hon. Secretary.

Mr. R. Cutler (Hon. Secretary) reported as follows :—

It will be recalled that at the end of 1937 it was decided to discontinue the January meeting, this making the number of meetings to be held in each subsequent year not less than six, but in 1938 the October meeting had to be abandoned owing to the international situation, and this year although the first three meetings were held in the usual way no further meeting other than the Annual General Meeting has proved possible.

In these circumstances the activities for the current year cannot well be compared with previous ones although the three meetings held were well attended and subject matter of considerable interest was brought forward. Prior to the summer recess four new members were elected, but we have been unfortunate to lose by death some well known members and past presidents, namely, Mr. Lewin Payne, Mr. A. T. Pitts, Mr. Carl Schelling and Mr. S. Spokes. Stress of war conditions will inevitably modify any plans already made for future activities and the question of future conduct of Society affairs has had the close attention of the Council. In due course it is hoped to circularise all members whose names remain on the current list with full details of such proposals as the Council may have made and which are now presented for discussion at the Annual General Meeting.

On the motion of Mr. H. Chapman, seconded by Mr. Gordon Taylor, the report was adopted.

Museum Report.

Miss L. M. Clinch (Curator) reported as follows :—

Some additions to the Museum have been made, including models presented by Miss Smyth and Mr. Chapman and some serial models of young children. An attempt has been made to collect specimens of different types of abnormalities which can be arranged as suggested by Mr. Northcroft in a paper read before the Society in 1935, and it is hoped that these, with serial models of normal cases, will make it possible for the Museum to be of genuine use in the future in the study of orthodontics.

On the motion of Mr. G. Northcroft, seconded by Mr. H. Chapman, the report was adopted.

Statement by the President.

The President : I thought it advisable, in the special circumstances that exist to-day, that I should make a short statement to this meeting. In accordance with the bye-laws we have to hold an Annual General Meeting in December. In some respects, I believe, the calling of this meeting has not followed our usual procedure, one being that no list of officers has been submitted for election.

For the second time in the Society's history, international affairs deeply affecting our private and professional life have compelled us to modify the Society's programme and general policy for the duration of the War.

As regards our headquarters here it may be known that our lease expires in September next. Bearing this point in mind, together with the fact that, by the date in question, the extent of the struggle in which we are involved may then be more clearly defined, it is in the first instance proposed that ordinary meetings be discontinued for the present and that the Council meet again before September next to review future policy.

The advisability of continuing meetings has been closely considered, but in view of the evacuation of so many of those patients with whom

our work is closely connected, and the manifold extra duties now occupying the attention of many of our members, it is felt that the result of holding our usual meetings even at hours other than normally held would hardly justify the effort incurred by those who might be asked to give papers at such meetings.

Bearing this in mind it is proposed to forego members subscriptions for 1940, if the War should so long persist, but that a members' register for 1940 be prepared and that members whose names remain thereon be circularised with reports of any Society activities or decisions that the Council may make at the proposed meeting to be held before September of next year.

It has been suggested that there should be no election of fresh officers for 1940, but that the present members should remain in office : in the event of any members of the Council being called upon for national service the Council under Rule 36 can elect new officers from the general body of members so that it can be maintained at full strength.

The Treasurer and Secretary have indicated their readiness to remain in office and would be in a position to deal with all inquiries by members. At this Annual Meeting, therefore, it would seem fitting that there should be discussion on the points that have been raised, together with an expression of formal approval from the members present that the Council should continue to function as at present constituted for the duration of the War.

Discussion.

Mr. G. Northcroft asked whether, if the Society did not hold any meetings until September, the owners of Manson House would be prepared to make any reduction in the rent of £45 which the Society paid. He thought the Council should be recommended to consider carefully the question of renewing the lease, if the tenancy terminated in September. It might be possible to obtain a more commodious room for the meetings of the Society at the headquarters of the British Dental Association, and it might be wise for the Council to commence negotiations with that Association or with some other body, with a view to obtaining a room at a lower rent than £45 a year, which seemed a considerable amount to pay when only six meetings a year were held. He thought the Society might well consider holding meetings before September.

The Hon. Secretary said he had approached the Secretary of Manson House, who said that, as facilities could be given for the Society to hold its meetings in the afternoon if need be, the owners were not prepared to consider a revision of the Society's outstanding commitments, and the point was stressed that the air raid shelter at Manson House compared very favourably with that of any other building in London.

With regard to obtaining a more commodious room elsewhere for the meetings of the Society, the average attendance was between fifty and sixty, and he thought the room at Manson House was very suitable and comfortable for the purpose of the meetings.

If the Society intended to hold fewer meetings, he had not the slightest doubt that the owners of Manson House would be prepared to meet the Society on the question of the rent.

The President said he thought it might be considered desirable for the Society to hold two or three meetings before September, in the early months of next year. It was obvious that the Society was liable for the rent until the September quarter, but the owners of Manson House could be approached with regard to reducing the rent after that.

Mr. Northcroft thought that £45 a year was an excessive rent to

pay when only six meetings were held in the year and that the Society would be very wise to terminate its lease.

Mr. HAROLD CHAPMAN asked whether the lease expired automatically in September.

The HON. TREASURER said he thought it expired automatically then.

Mr. CHAPMAN suggested that, if the Society wished to continue to hold its meetings at Manson House, it might negotiate for a new lease on more favourable terms than the present ones.

In September or October last he might have felt that the Society's activities should cease for the time being, but London was now returning to a more normal state. The London County Council had decided to revive its monthly meetings, and he thought the Society might well consider holding its ordinary meetings next year. Several papers had been prepared which had not yet been read. There had been nothing on the agenda for the present meeting to attract members to it, yet there was a fair attendance, and that showed that a number of members were keenly interested in the vitality of the Society.

Mr. MAXWELL STEPHENS agreed with Mr. Northcroft and Mr. Chapman with regard to continuing the meetings of the Society. He thought those members who were away from London liked to have a background behind them and to know that the Society was carrying on as usual ; it was the spirit of the thing that was important.

Mr. RIX asked what the Society had done during the last war with regard to holding meetings.

The HON. SECRETARY said that meetings had been held in 1914 and 1915 ; they ceased to be held after the meeting in March, 1916, with the exception of the Annual General Meetings.

The PRESIDENT said the question arose as to whether the Society should hold meetings in the provinces instead of in London, possibly under the ægis of the British Dental Association, which meetings might be addressed by London members, who had more time on their hands.

Mr. GORDON TAYLOR said he had received a letter from a friend of his, a school dentist who had recently taken up private practice in Swanage. He wrote that there were many town children at the schools in his district and he had had a number of orthodontic cases to deal with ; he therefore wished to extend his knowledge of orthodontics and would like to join the Society with that end in view. He felt it was unfortunate that he had had to write and tell his friend that the Society had ceased to function for the time being, but he had added that he hoped it would start again soon. He was a member of several other organisations, chiefly concerned with public dentistry, and they were still holding meetings and, as far as he knew, would continue to do so. In some cases small groups met in London and the provinces.

Judging by what had happened in the Spanish War, the places most likely to be raided from the air would be those with the most inadequate defences. London was very well defended indeed, but there was a possibility that the south coast or Essex might be heavily bombed in preference to London, and it might even come about that people would be evacuated to London from the country.

If the meeting would like to deal with the matter by a resolution, he would propose the following :—

> "That for the duration of the war the affairs of the Society should be vested in the Council elected in 1938, which shall have power to call such meetings as it considers necessary, including the Annual General Meeting."

Mr. NORTHCROFT said he would second the resolution if the word "necessary" was altered to "feasible." He did not think any meetings of the Society could be described as "necessary," except the Annual General Meeting.

Mr. GORDON TAYLOR accepted the amendment.

Mr. HAROLD CHAPMAN said he was a little concerned about the legality of the present proceedings. The agenda had not been sent out in the usual form. Did the President consider that a resolution could be presented of which notice had not been given? Members who had received notice of the meeting but who were not present did not know anything about the resolution or the suggestion that meetings should not be held until September.

The HON. SECRETARY thought it must have been clear to members that such matters would come up for discussion. They must have realised, from the fact that no proposals for the election of the Council had been put down, that the circumstances were such that decisions might have to be taken regarding future policy. He thought the notice which had been sent out was a direct invitation to all those members interested in the Society to attend the meeting, but, in spite of that direct invitation, the number of Council members present almost outweighed the number of ordinary members present at the meeting. He had received letters from three or four members saying they were sorry they could not attend and making certain proposals which they wished to put before the meeting. To his mind, the attendance was a very disappointing one.

The Council had considered the matter on various occasions in an informal manner between the outbreak of war and the present time, and it had felt that nominations to the Council for next year could not well be put forward, as it was quite problematical whether the Society would be able to hold its meetings, and the present Council did not want to suggest that it should remain in office.

Mr. CHAPMAN said he did not think Mr. Cutler had quite understood his point. He was willing to accept without demur the President's ruling as to whether the resolution was in order or not.

The PRESIDENT said the resolution was an important one and he would like to do what the meeting wished with regard to it. In what respect did Mr. Chapman think that the meeting was not a properly constituted Annual General Meeting? It was being held in December, in conformity with the bye-laws.

Mr. CHAPMAN said his chief point was that there were no nominations for officers.

Mr. NORTHCROFT thought it might well have been stated on the notice of the meeting that the Council thought it desirable that the present officers should continue in office. A list of them could have been given, and a vote taken at the meeting. He agreed with Mr. Chapman that the members had not been told on the agenda what they would be asked to vote upon, and therefore they were not interested and had not come to the meeting.

The HON. SECRETARY said they had been invited to attend for discussion, and the response to the invitation had not been as encouraging as he had hoped it would be.

Mr. E. A. HARDY said that he, as an ordinary member, thought that the notice of the Annual General Meeting had not been long enough. As some of the other meetings since the war broke out had not been held, the members had not realised that there would be a meeting in December, and the notices had not been sent out until quite recently.

The HON. SECRETARY said the notices had been sent out two clear week-ends before the meeting, and that had been the procedure followed for many years.

Mr. HARDY thought that as the other meetings had not been held, many of the members had not expected that a meeting would be held in December, and perhaps that was why they had not attended it.

The PRESIDENT said the Council was quite willing to call another Annual General Meeting to regularise matters, if the members wished that to be done.

Mr. CHAPMAN said he would like to suggest that the Council should reconsider the question of holding the usual six meetings a year, after having heard the discussion that afternoon.

Mrs. MICHAELIS asked whether the Council had any reason for not wishing to hold meetings, apart from the question of air raids and the "black-out." Mr. Cutler had said that there was a good air raid shelter at Manson House, and the trouble of the "black-out" could be overcome by holding the meetings in the afternoon.

The PRESIDENT said he had given the Council's main reasons in his statement. (*He read the paragraph again.*) It was thought that if there were very meagre attendances at the meetings the work entailed by the preparation of papers might not be justified, and there was also the difficulty experienced by some members in getting to London, but that did not apply so much, perhaps, at the present time. In order to ascertain whether the meeting wished the resolution to go forward, he would move from the chair that it should do so.

The motion was carried unanimously.

The PRESIDENT said that since the resolution had been proposed and seconded, Mr. Chapman had put forward another suggestion, that the Council should reconsider the question of holding the normal meetings.

Mr. CHAPMAN said that might be taken as a further resolution.

Mr. BUTCHART, speaking as a country member, said the question had been raised of meetings being held in the provinces rather than in London. A large percentage of the members lived in London and its suburbs, and he thought that meetings held in London would have a very much better attendance than meetings held in the country.

The PRESIDENT said that Mr. Maxwell Stephens had pointed out that the background was important. He thought most of the members would agree that the meetings should be held at headquarters.

Mr. RIX thought the attendance at meetings held by the Society would be poor and discouraging to those who were asked to read papers. He felt that for the time being a certain amount of interest had gone from the subject of orthodontics and that it would not be worth while to hold meetings at regular intervals.

Mr. BUTCHART differed from the last speaker. He had been requested by various orthodontists in London to look after the orthodontic work which they were doing for boys at the schools which he attended, and he did not think that interest had been lost in the subject of orthodontics.

Mr. MAXWELL STEPHENS thought that meetings of the Society should continue to be held. The spirit which went forth from them would make them worth while.

The PRESIDENT asked Mr. Wilson Charles, the Programme Secretary, to give his opinion on the subject.

Mr. WILSON CHARLES said he was entirely in the hands of the meeting. He saw no reason why a certain number of papers should not be obtained, and, as far as he was concerned, he would be only too pleased to do anything he could to arrange a meeting.

Mr. NORTHCROFT said that in any event a meeting would not be held until February. He thought the feeling of the meeting undoubtedly was that a meeting should be held then, and the resolution was a strong recommendation to the Council that, if it was at all feasible, the usual meetings should be held, in spite of the war.

Mr. RUSSELL MARSH agreed that it was desirable to hold meetings

of the Society, if it were possible to do so. If six meetings in the year could not be held, it might be left to the Council to consider holding a sufficient number of meetings to keep members in touch. Owing to the evacuation of children to the provinces, many dentists were seeking for orthodontic knowledge who never thought about it before.

Mr. NORMAN GREY said that in Eastbourne it had been suggested that meetings should not be held. One meeting had been held to decide the policy to be adopted and it was then suggested that meetings should be held to discuss problems arising out of the war. It was found that there were a great many of such problems, and it had been decided that meetings should be held as before. There must be a number of orthodontic problems arising out of the war. The relation between London and provincial orthodontists might be a very attractive subject for a meeting in February, and it might be well to have a meeting then, of which notice was given well ahead and which was well advertised, and see what kind of response was obtained.

Mr. NORTHCROFT, referring to the wording of the resolution proposed by Mr. Gordon Taylor, said that no one knew how long the war would last and he therefore suggested that it should read " Annual General Meetings " instead of " Annual General Meeting."

Mr. CHAPMAN suggested that the word " Meeting " should remain in the singular and that the words " for the duration of the war " should be altered to " for the year 1940."

Mr. GORDON TAYLOR and Mr. NORTHCROFT agreed.

The PRESIDENT then put the resolution to the meeting in the following form :—

> " That for the year 1940 the affairs of the Society should be vested in the Council elected in 1938, which shall have power to call such meetings as it considers feasible, including the Annual General Meeting."

The resolution was carried unanimously.

The PRESIDENT asked Mr. Chapman whether he wished his recommendation to be placed on the Minutes as a strong recommendation to the Council. The Council was represented fairly fully at the present meeting, but the recommendation could go on the minutes if Mr. Chapman wished that to be done.

Mr. CHAPMAN said he did not wish it.

Mr. NORTHCROFT asked whether the President wanted a formal resolution with reference to the abrogation of the subscription.

The PRESIDENT thought it might strengthen the hands of the Council.

Mr. NORTHCROFT accordingly moved :—

> " That this meeting approves of the suggestion of the Council that the annual subscription should be in abeyance for the year 1940."

Mr. GORDON TAYLOR seconded the resolution.

Mr. RUSSELL MARSH asked whether the resolution applied to new members.

Mr. HARDY thought that if meetings were held the members should pay their subscriptions. If there were no meetings, there should be no subscriptions.

The HON. SECRETARY said the Society was committed to its major expenses for the year 1940, whether it held meetings or not.

Mr. NORMAN GREY thought that if the resolution was passed it might prevent some resignations at a critical period. It would be quite easy to revert to the subscription in the following year.

The PRESIDENT said the question of the resolution applying to new members would have to be decided. He did not know whether the present meeting should decide it or whether it should be left to the Council.

Mr. CHAPMAN thought that such a question should be decided by the Annual General Meeting or by a special meeting convened for the purpose. A difficulty arose in that no notice had been given of the matter, and he did not know whether an alteration could be made in the subscriptions by the present meeting. He did not think new members should be allowed to come into the Society without paying a subscription.

The PRESIDENT asked whether Mr. Chapman thought that Mr. Northcroft's proposal was out of order.

Mr. CHAPMAN said he thought it was very doubtful, because it was not on the agenda and it vitally affected the Society.

Mr. NORTHCROFT said that, in order to cover the question of new members paying subscriptions, he would insert the words " for present members " after the words " annual subscription."

The resolution was then put to the meeting in the following form, and was carried unanimously :—

> " That this meeting approves of the suggestion of the Council that the annual subscription for present members should be in abeyance for the year 1940."

HONOUR FOR MEMBER.

THE PRESIDENT was glad of the opportunity of informing members that Mr. Maxwell Stephens had been made Vice-Chairman of the Orthodontic Section of the Centenary Meeting of the American Dental Association to be held in Baltimore in March, 1940.

He congratulated Mr. Maxwell Stephens on the honour which had been conferred upon him, which was very welcome to the Society.

APPOINTMENT OF AUDITORS.

Mr. GORDON TAYLOR said that, although it had been agreed that the members of Council appointed in 1938 should remain in office, there had been no mention of the auditors. When he had been an auditor some years ago, he had discussed the matter with Mr. Evans, the Honorary Treasurer, and Mr. Evans had suggested that it might be possible to appoint a chartered accountant to audit the accounts, instead of two auditors being elected from the members of the Society.

The PRESIDENT said that the accounts for the present year had been audited by the Society's Honorary Auditors.

The HON. TREASURER said that, in view of the fact that the subscriptions for 1940 were not going to be paid, he did not know whether the expense of having a chartered accountant appointed as auditor would be justified.

Mr. CHAPMAN thought the Council should consider the matter before any decision was arrived at upon it. It seemed to him that if a professional auditor were appointed there should also be honorary auditors appointed from among the members of the Society. They might be able to make suggestions from the orthodontic point of view which would not occur to a professional auditor.

The PRESIDENT said the Council would probably meet in February and could then consider the matter.

On the motion of Mr. GORDON TAYLOR, seconded by Mr. RIX, it was agreed that the present auditors should be re-elected for the year 1940.

VOTES OF THANKS.

Mr. WILSON CHARLES proposed a hearty vote of thanks to the President for his services, and the motion was carried with acclamation.

On the motion of Mr. HAROLD CHAPMAN, a hearty vote of thanks was accorded to the officers of the Society and to the members of the Council, and the meeting then terminated.

BRITISH SOCIETY FOR THE STUDY OF ORTHODONTICS

STATEMENT OF ACCOUNTS, 1938–1939

Receipts.

	£	s.	d.
By Members' Subscriptions	276	19	10
,, Interest on Investments	11	17	4
	£288	17	2

Payments.

	£	s.	d.
To Rent at Manson House	45	0	0
,, Rent at Hill Street	25	0	0
,, Printing and *Transactions*	65	8	11
,, Reporting	16	16	0
,, Refreshments	15	4	0
,, Hire of Electric Standards and Tables	3	0	0
,, Petty Cash	13	14	1
,, Refunded Subscriptions	1	1	0
,, Bank Debits	0	8	4
,, Insurance on Books and Badges	0	15	0
,, Slides and other Demonstration Expenses ..	1	0	0
,, Lantern Attendant	1	10	0
,, Removal of Cabinets	1	1	0
,, Honorarium to Dr. de Coster	25	0	0
,, Wreath for Mr. Carl Schelling	1	1	0
	215	19	4
Credit Balance	72	17	10
	£288	17	2

Assets.

	£	s.	d.
500 National Savings Certificates—Present Value ..	642	9	0
2½% Consolidated Stock—Purchase Value	400	5	6
Cash at Bank	300	3	0
Cash in Hand—Secretary	0	14	7
Treasurer	0	18	4
Librarian	0	7	8
Total	£1,344	18	1

We have examined the Books and Vouchers and certify the above Statement of Accounts to be correct.

W. LESLIE BONESS.
SYDNEY B. NEWTON.

December 7th, 1939.